TITANINE DOPE
See Advert. page 14

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FLIGHT

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A JOURNAL OF AERONAUTICAL PRACTICE, LOCOMOTION AND SHIPS

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 1056. (No. 12. Vol. XXI.) Registered at the General Post Office as a Newspaper. MARCH 21, 1929. SIXPENCE WEEKLY.

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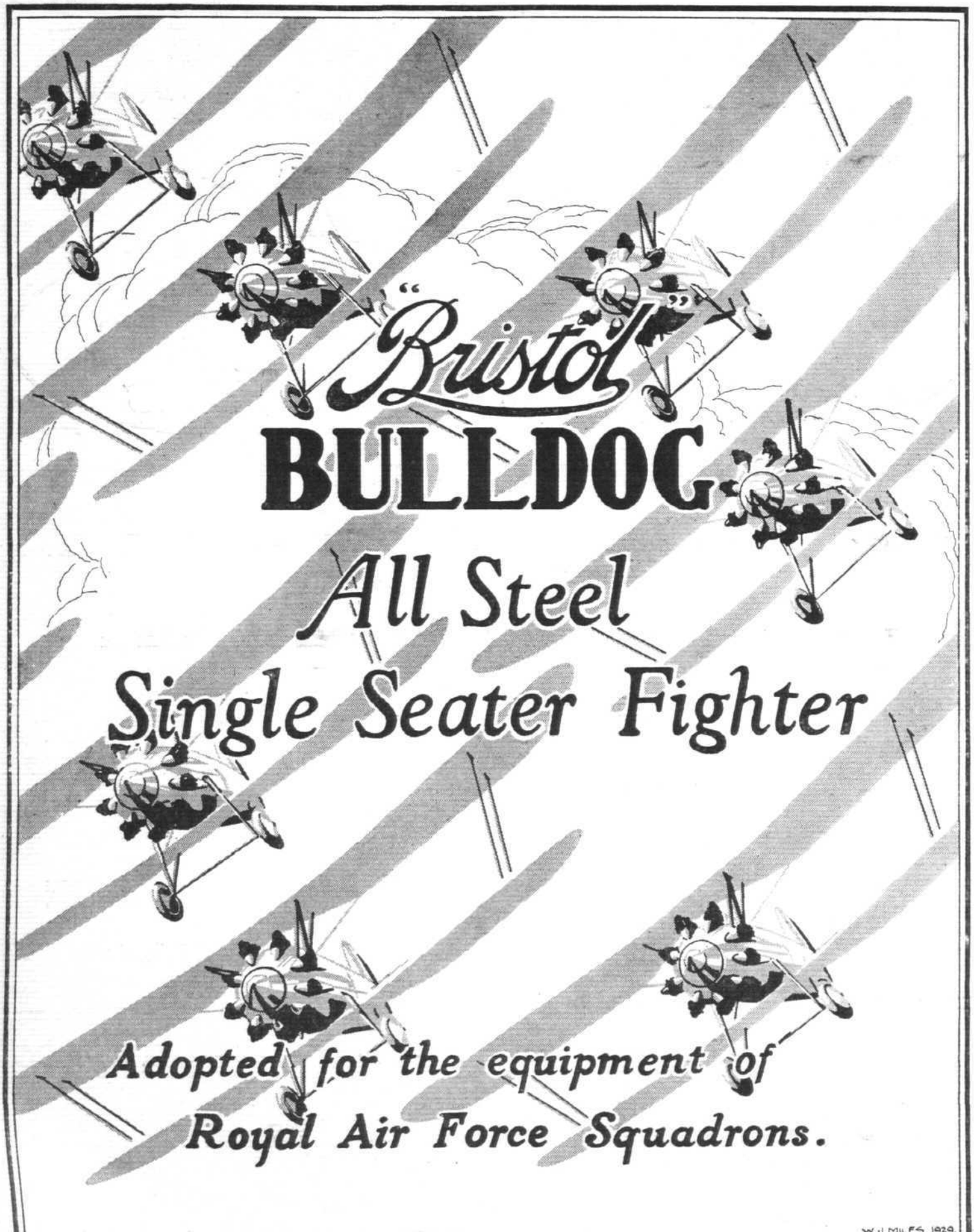

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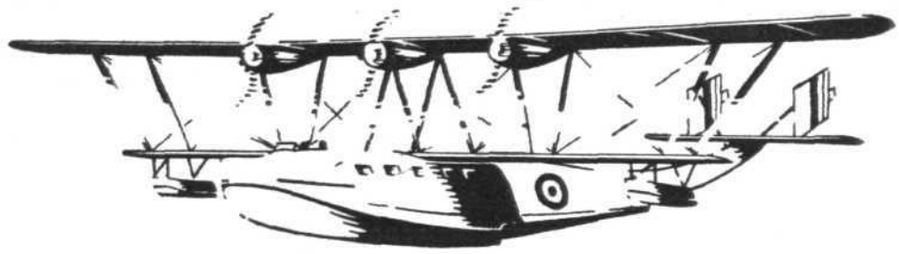

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OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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CONTENTS

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1929.

Mar. 27	Royal Aero Club Annual General Meeting.
Mar. 29-30	Cinque Ports Flying Club Easter Meeting, Lympne.
April 11	Lecture, "Wind Tunnel Methods of the Eiffel Laboratory," by M. Lapresle, before R.Ae.S. and Inst.Ae.E.
April 18	Lecture, "R.101," by Col. V. C. Richmond, before R.Ae.S. and Inst.Ae.E.
April	Exhibition of Sporting and Touring Aircraft, Switzerland.
May 21	Northampton Air Pageant.
June 19-22	F.I.A. Conference, Copenhagen.
June 27-30	Rotterdam International Air Meeting.
July 5-6	King's Cup Race.
July 13	R.A.F. Display at Hendon.
July 16-27	7th International Aero Exhibition, Olympia.
July 28	International Flying Meeting, Sweden.
Aug. 1-14	French Light Plane Meeting, Orly.
Aug. 15	International Balloon Race, Poland.
Sept. 6-7	Schneider Trophy Race, Solent.
Sept. 10-20	Aero Club de France Meeting, Le Baule.
Oct. 1	Gordon-Bennett Balloon Race, St. Louis, U.S.A.
Oct. 31	Guggenheim Safe-Aircraft Competition Closes.

EDITORIAL COMMENT

IT is to be feared that the great majority of the audience remained, like Mr. Handley Page, "unpersuaded" at the lecture by Signor Isacco before the Royal Aeronautical Society on Monday last. Signor Isacco was so obviously sincere, was undoubtedly very persuasive, was, in spite of his apology, a far better master of the English language than most had expected, and yet he somehow "failed to get across," as the theatrical profession has it. Personally we rather regret that the paper was read just at this particular time. The lecturer did not give chapter and verse for all his statements, although no one will doubt that he would be able to do so. As Mr. Wimperis, Director of Scientific Research, pointed out, the technicians at the Air Ministry went very fully into the problems before it was decided to spend the taxpayers' money on experimenting with the "Helicogyre," and unless there is at least a chance of success, the machine which Saunders has now completed would probably not have been built, certainly not with Government money.

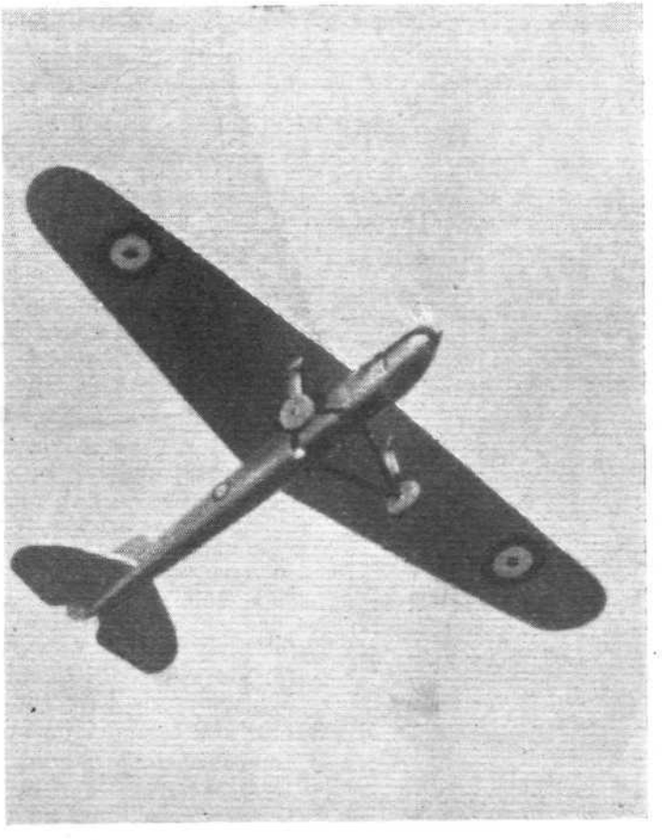
The "Merry-go-Round"

But to us it seems that either the paper should have been read some time ago, with much fuller particulars being given of the things about the invention which really matter, or else the lecture should have been deferred until after the trial flights, when practical points could have been discussed. As it was, there was a vagueness about the paper which was unsatisfying. We do not blame Signor Isacco for this. Doubtless from his point of view and that of the Air Ministry he did quite right in treating the subject in a very general way only, but the result was that there was nothing very tangible to get hold of for discussion.

Problems innumerable could be brought up, and quite a good many were, but one somehow never got to grips with realities. We have not the slightest doubt that, on paper, Signor Isacco has a very good answer to every criticism, but even, as we said last week, if his theories are entirely correct, the many practical difficulties still remain. With four engines chasing each other around in a circle, like four infuriated bulls around a haystack, it will be

impossible for the pilot to know at all times exactly what each of the four engines is doing. Signor Isacco referred to the possibility of the wing engines stopping, and proved, at least to his own satisfaction, that the machine would still remain aloft. But what if, as Mr. Handley Page suggested, one of the engines "shed some bits"? Any engine is liable to blow out a sparking plug. Engines have even been known to drop a cylinder. With wing engines chasing around in a circle at some 200 m.p.h. or possibly more, the effect of the loss of even a few ounces in weight might have serious consequences. Vibrations would be set up, and might be sufficient to wreck the rotating wing system. At least the machine would be likely to get out of control.

Then there is the problem of the articulated wings, which were hailed by Mr. Wimperis as responsible for placing the rotating wing machine on a practical plane in that they give it natural stability and avoid the rolling moment inseparable from the fixed blade type. Signor Isacco referred to the necessity of having the wings articulated for drag as well as lift. But he did not state, nor apparently did it occur to anyone to ask, how the four blades are to keep their distance. If one of the four wing engines should happen to develop more thrust than the engine preceding it, it would presumably overtake the engine in front. Some form of limit must be imposed upon the travel in the plane of rotation permitted to each blade.



["FLIGHT" *Photograph*

WHITHER AWAY? Photograph of the Napier-engined Fairey long-distance monoplane on a test flight. This machine is to be sent on a flight to beat the existing world's record. No destination has yet been given.

Reference was made during the discussion to the performance of an "Autogiro" blade if its pitch is suddenly changed (accidentally). In the words of the speaker "it flies right up." In other words, it rises to a quite alarming extent. Signor Isacco proposes to control each blade as an aerofoil by means of an aileron which is, he claims, in effect an elevator for that particular blade. One would expect the flap angle to require particularly nice adjustment, as the diagrams seemed to indicate that each blade is held in a form of ball-and-socket joint at the central hub, and that if this is the case "over controlling" might result in rather violent flapping of the wings.

We sympathise entirely with the views of the Air Council, as expressed by Mr. Wimperis, that the rotating wing machine should be explored in order that we may not some day wake up to a realisation of the fact that its problems have been left alone by us while someone else with more foresight has worked at it and discovered its possibilities. But we do think that the lecture on the "Helicogyre" should have been deferred until further particulars of it could be given. Another lecture by Signor Isacco would, as Col. Sempill pointed out, be very welcome at a later stage.

❖ ❖ ❖

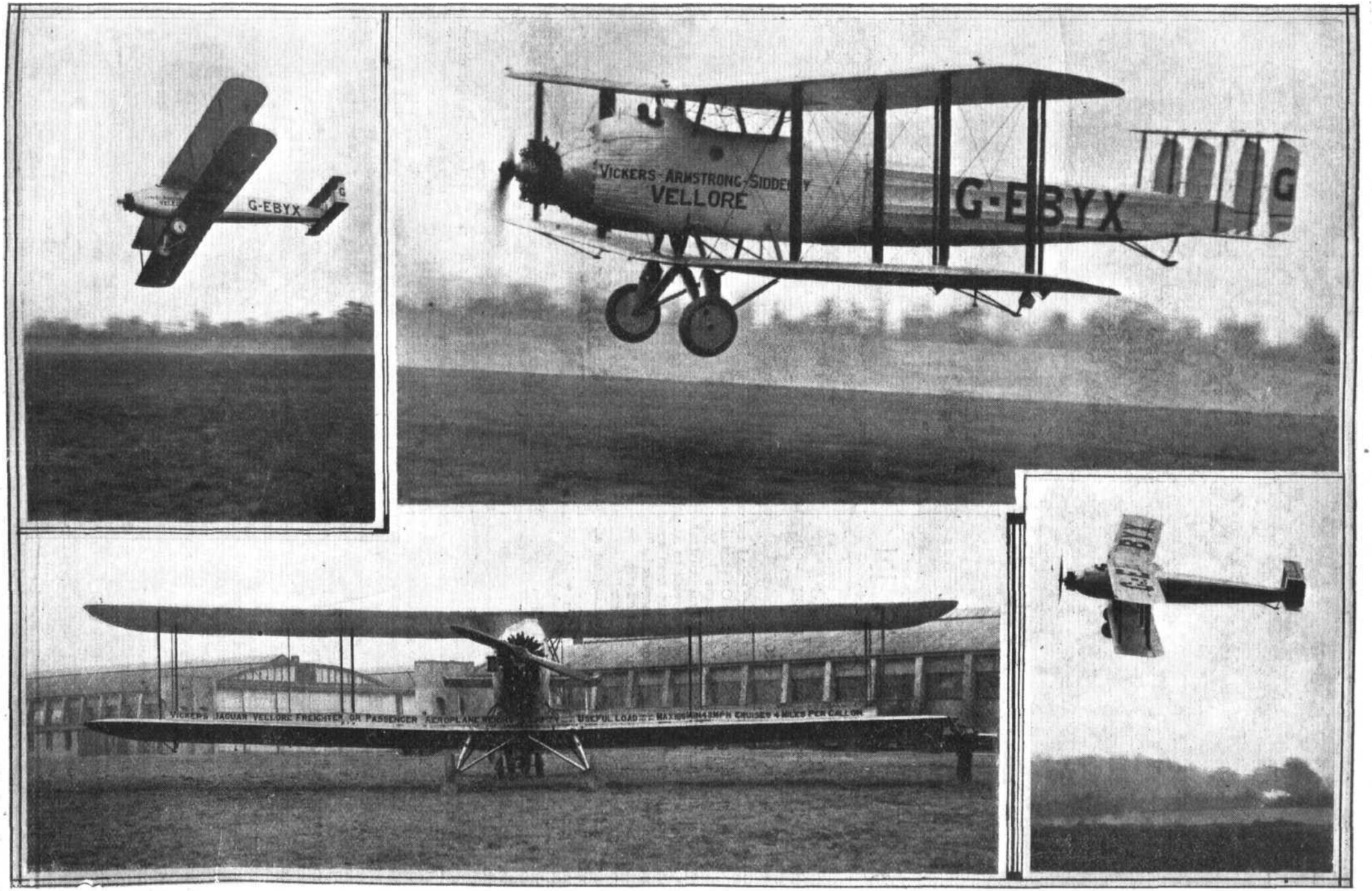
Jet Propulsion

Curiously enough, during the discussion of Signor Isacco's lecture on the "Helicogyre," the subject of jet propulsion was not raised at all. The lecturer did refer to it, but in a rather apologetic way as something a very long way out in the future. Yet the subject is not without interest in this connection. Motor cars have been driven by rockets (with varying success, it is true) in Germany, and model aeroplanes with rocket propulsion have been flown. But the chief difficulty appears to be that until very high speeds are reached, the efficiency of jet propulsion is very low. Now in the "Helicogyre" type of machine it would seem that there is a much better chance of using jet propulsion effectively. The blade tips can be made to travel quite fast. Already we understand that tip speeds of 200 to 300 m.p.h. are discussed. At the start, *i.e.*, until the rotating wings had gathered speed, the propulsion would be inefficient, but at least the aircraft as a whole would not have to travel along the ground at tremendous speed before taking off. Whether such an aerial "Brock's Benefit" is desired, even if it is possible, we do not know. We rather share the views of Mr. Handley Page that there are far too many varying factors. But if it is wanted, then here would seem to be an opportunity for the jet propulsion enthusiasts. It may be, of course, that this is what Signor Isacco has in mind, and that he is only using petrol engines on the wings while developing his machine, and until the extra problems of jet propulsion have been solved.

◈ ◈ ◈ ◈

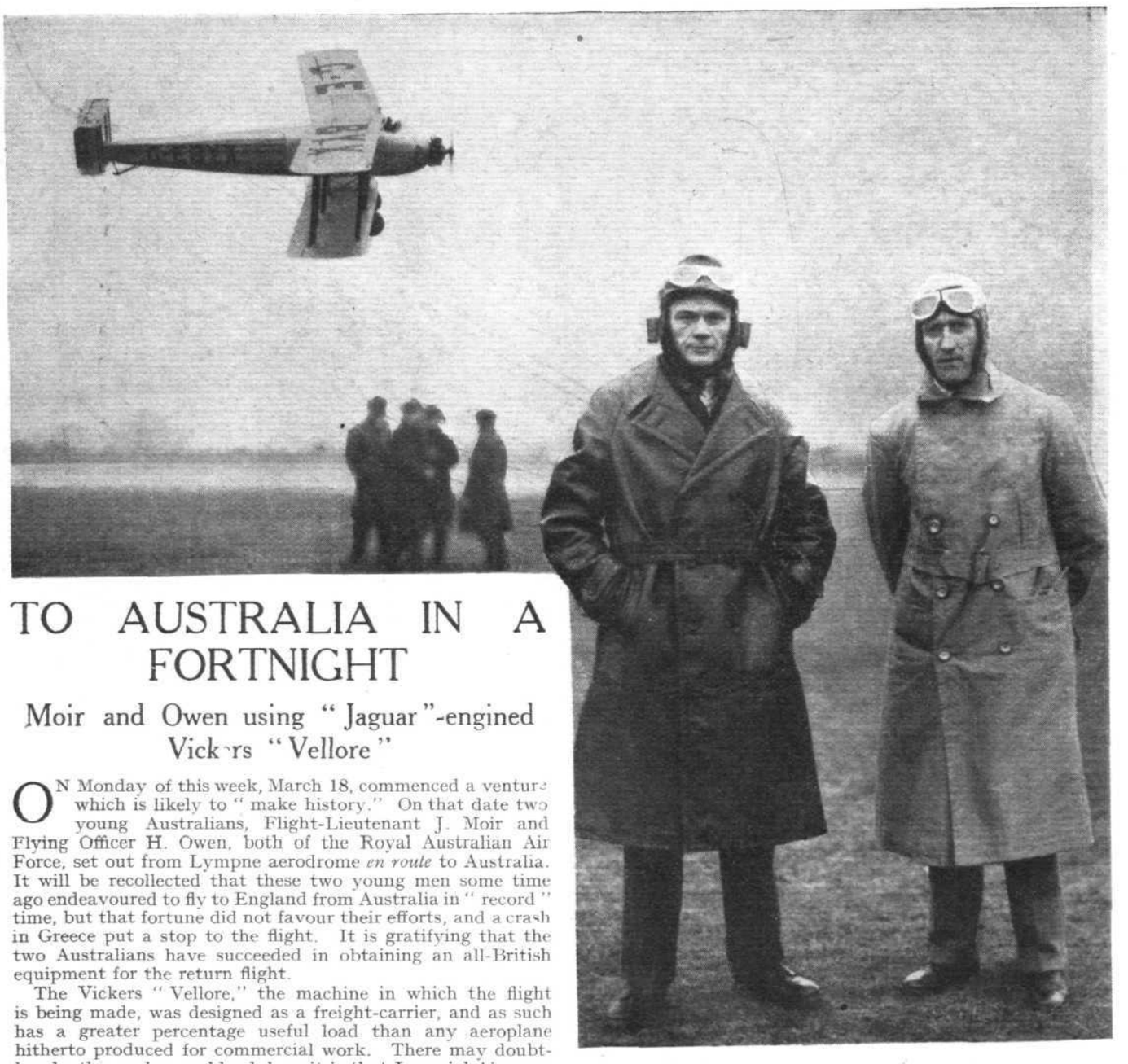
Cirrus Service

AN example of the brisk business methods of our aero-engine manufacturers is revealed in the following incident. The Curtiss Reid Aircraft Co., Ltd., who are fitting "Cirrus" engines, cabled for drawings of the Cirrus Aero Engine Co.'s new form of induction system, which they wished to incorporate in their current installations. Within about 36 hrs. they received the necessary drawings from London, *via* radio tele-photography, which were transmitted by the Marconi Company.



["FLIGHT" *Photographs*

TOWARDS AUSTRALIA: The Vickers "Vellore," with Armstrong-Siddeley geared "Jaguar" engine, on which Moir and Owen are making a fast flight to Australia. (See pp. 230 and 231.)



TO AUSTRALIA IN A FORTNIGHT

Moir and Owen using "Jaguar"-engined Vickers "Vellore"

ON Monday of this week, March 18, commenced a venture which is likely to "make history." On that date two young Australians, Flight-Lieutenant J. Moir and Flying Officer H. Owen, both of the Royal Australian Air Force, set out from Lympne aerodrome *en route* to Australia. It will be recollected that these two young men some time ago endeavoured to fly to England from Australia in "record" time, but that fortune did not favour their efforts, and a crash in Greece put a stop to the flight. It is gratifying that the two Australians have succeeded in obtaining an all-British equipment for the return flight.

The Vickers "Vellore," the machine in which the flight is being made, was designed as a freight-carrier, and as such has a greater percentage useful load than any aeroplane hitherto produced for commercial work. There may doubtless be those who would ask how it is that Imperial Airways, for whom the machine was originally intended, cannot find a use for such an efficient machine, and the question is quite a logical one. The "pay load" of the "Vellore" is very great indeed. For instance, if used on a relatively short route, such as the London-Paris, the pay load is in the neighbourhood of 9 lb. per horse-power, which is more than double the figure attained by the great majority of machines now in use. The answer is, we believe, that Imperial Airways have once, and apparently for all, decided on the multi-engined type, and as the "Vellore" has but a single-power unit it does not meet with approval. We should hesitate to say that this policy is necessarily right, but it *is* a policy, and as such is adhered to.

For the flight to Australia the "Vellore" has been fitted with one of the geared Armstrong-Siddeley "Jaguars," and for a relatively slow machine such as the "Vellore," the extra propeller efficiency is very well worth having, not only because it improves the take-off, which is extremely good in any case owing to the low wing loading, but also because of the greater efficiency at cruising speed, which increases the range for a given quantity of petrol.

Originally the "Vellore" had its cabin space available for freight. The greater part of this space is now occupied by petrol tanks so as to enable the machine, if necessary, to cover very long stages without refuelling. No exact information is available concerning the quantity of fuel carried, but from the fact that the tare weight of the machine is 4,605 lb. (2,089 kg.), and the useful load 4,895 lb. (2,211 kg.) it is obvious that flights of quite long duration can be made.

One of the interesting features of the flight is that it is being made on a machine in which great useful load rather than high performance has been aimed at. The ratio of useful load to tare weight is exceptionally high, especially in view of the fact that for the figures given, *i.e.*, the machin carrying considerably more than its own weight, the certific cate of airworthiness is not exceeded. Thus the flight is at once taken out of the "stunt" category, and will demonstrate what sort of service might be expected under actual working conditions. With a top speed of 108 m.p.h. (174 km./h.) and a landing speed of 48 m.p.h. (77 km./h.), it should not be difficult to find work for such a machine in Australia, and it is to be hoped that the two Australian officers will be successful in getting to Australia without mishap, as this would be of even greater value than making the flight in "record" time. How efficient the "Vellore" is may be gathered from the fact that it cruises at 4 miles per gallon, with a useful load of more than 2 tons; in other words, its economy is slightly better than 8 ton-miles per gallon, which is a figure, we venture to think, has not often, if ever, been attained before. This rather amazing efficiency is due partly to a very low structure weight (all-duralumin construction), and partly to efficient aerodynamic design, with low "span loading."

As the crew of the machine may frequently have to handle it on the ground unassisted, considerable trouble has been taken to provide for this being possible. To start the "Jaguar" engine a long cranked starting handle has been evolved, with the aid of which a member of the crew may stand on the ground and crank the engine. One of our photographs shows this operation being performed.

A lightly-loaded machine like the "Vellore" is likely to be rather easily blown over when standing on the ground,

H. Owen *J. Moir*

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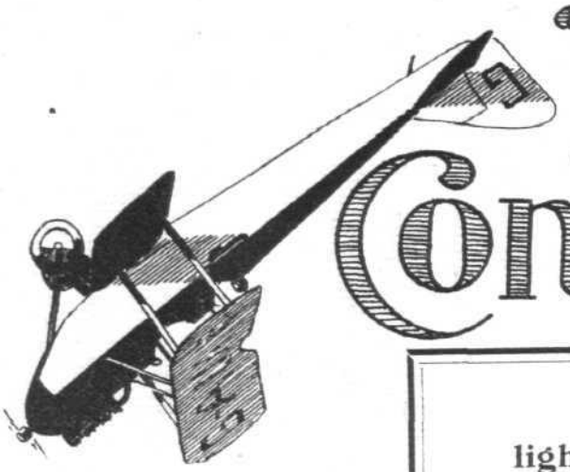

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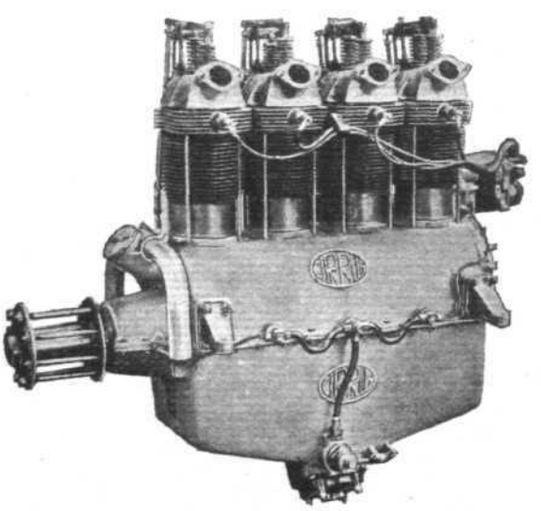

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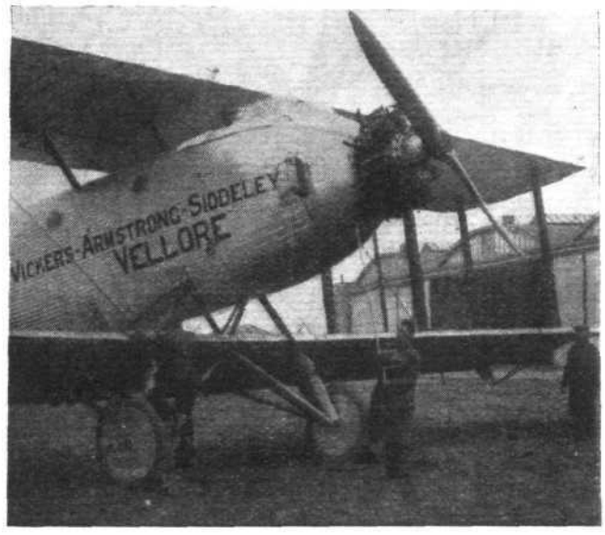
and so a "lift spoiler," after the style used on flying-boats has been produced. This takes the form of a long strip of Willesden canvas strung along the leading edge of the lower wing. Here it breaks the normal air flow, and prevents the machine from "kiting" off the ground. At the same time it serves as quite an effective "hoarding," as will be seen in one of our photographs.

First Stages of the Flight

Leaving Lympne Aerodrome shortly after 7 a.m. on March 18, the "Vellore" crossed to France and flew across that country without alighting, arriving after a non-stop flight at the Marseilles aerodrome at half-past five the same afternoon, having covered the distance from Lympne in approximately 10¼ hours. As the distance from Lympne to Marseilles is something like 580 miles, the average speed for the stage was only some 56·5 m.p.h. It seems fairly evident that a strong head wind must have been encountered during the greater part of the flight.

It is believed that the original intention of Moir and Owen was to try to reach Rome on the first day of the flight, but presumably the head wind which delayed the arrival at Marseilles made it too late to continue on to Rome that day.

A start was made from Marseilles on Tuesday, March 19, and Rome was reached at 4 p.m. At the moment no information is to hand as to what flying time the machine took for this stage, and so it is not possible to estimate the speed made good between Marseilles and Rome.



["FLIGHT" *Photograph*

NOT A CONJUROR : The man in this photograph is not balancing the Vickers "Vellore" on a stick, but is starting the "Jaguar" by means of a long detachable cranking handle.

◈ ◈ ◈ ◈

ROYAL AIR FORCE AWARDS

THE King has give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition for services rendered in connection with the operations against the Akhwan in the Southern Desert, Iraq, during the period November, 1927-May, 1928 :—

C.B.E. (Military Division)

Group Captain Eric Roper Curzon Nanson, D.S.C., A.F.C., Royal Air Force.

Wing Commander Hazelton Robson Nicholl, O.B.E., Royal Air Force.

O.B.E. (Military Division)

Flight-Lieutenant Harold Hindle James, Royal Air Force.

The King has approved of the following rewards in recognition of gallant and distinguished service rendered in the operations against the Akhwan in the Southern Desert, Iraq, during the period November, 1927-May, 1928 :—

Second Bar to the Distinguished Flying Cross.—Squadron-Leader Harold Alfred Whistler, D.S.O., D.F.C.

Distinguished Flying Cross.—Flight-Lieutenant Vivian Steel Parker.

Distinguished Flying Medal.—243282 Flight Sergeant Norman Gardner ; 335297 Sergeant (Pilot) Edward Coleman ; 362659 Leading Aircraftman Colin Graham Reeve.

The names of the following have been brought to notice by Air Vice-Marshal Sir Edward L. Ellington, K.C.B., C.M.G., C.B.E., Air Officer Commanding, British Forces in Iraq, for distinguished services rendered in the operations against the Akhwan in the Southern Desert, Iraq, during the period November, 1927-May, 1928 :—

Royal Air Force

Squadron-Leader Hugh Leonard Burton, M.B. ; Flight-Lieut. Richard Harrison, D.F.C. ; Squadron-Leader Gilbert Stuart Martin Insall, V.C., M.C. ; Flying Officer Rolf Booth Hilton Jackson (killed) ; Flight-Lieut. (now Squadron-Leader) Robert Jope-Slade, D.S.C. ; Flight-Lieut. (now Squadron-Leader) Charles Ley King, M.C., D.F.C. ; Flying Officer George William Longstaff ; Squadron-Leader Arthur Hicks Peck, D.S.O., M.C. ; Flight-Lieut. Michael Walter Crang Ridgway ; Squadron-Leader Francis John Vincent, D.F.C. ; 363572 Corporal Arthur Joseph Chopping ; 155159 Sergeant (Pilot) (now Flight-Sergeant) Herbert John Coppin, A.F.M. ; 361636 Leading Aircraftman William John Singleton.

Miscellaneous

Captain J. B. Glubb, O.B.E., M.C., Administrative Inspector.

The King has given orders for the following appointment to the Most Excellent Order of the British Empire in recognition for services rendered in the operations in the Protectorate of Aden during the period June-August, 1928 :—

O.B.E. (Military Division)

Flight-Lieut. Aubrey Robert Maxwell Rickards, A.F.C., Royal Air Force.

The King has approved of the award of the Medal of the Military Division of the Most Excellent Order of the British Empire for meritorious service rendered in the operations in the Protectorate of Aden during the period June-August, 1928 :—

348912 Leading Aircraftman Alexander Smith, Royal Air Force.

The King has also approved of the following rewards in recognition of gallant and distinguished service rendered in the operations in the Protectorate of Aden during the period June-August, 1928 :—

Distinguished Flying Cross.—Flying Officer (now Flight-Lieut.) George Norman Patrick Stringer (Lieut., Regular Army Reserve of Officers, The Queen's Own Royal West Kent Regiment).

Distinguished Flying Medal.—352222 Corpl. Henry Joseph Barber.

The names of the following have been brought to notice by Group-Capt. William G. S. Mitchell, C.B.E., D.S.O., M.C., A.F.C., Commanding Officer, British Forces in Aden, for distinguished services rendered in the operations in the Protectorate of Aden during the period June-August, 1928 :—

Sqdn.-Ldr. (now Wing Comdr.) Geoffrey Hilton Bowman, D.S.O., M.C., D.F.C.

Flying Officer Francis Jack Moon.

359069 Aircraftman 2nd Class (Acting Sergt. (Pilot)) Reginald Arthur Markwick.

355994 Sergt. (Pilot) Arthur Newark.

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Looping at Felixstowe

THE daily press has recorded the fact that Flying Officer R. L. Atcherley, a member of the R.A.F. High-Speed Flight, has looped one of the racing seaplanes while training for the forthcoming Schneider Trophy contest. This event was known to the staff of FLIGHT some time ago, but, as it was not officially announced, we respected the official reticence. Now that it is common knowledge, we think it should be placed on record.

◈ ◈

A Story about Petrol

A SMALL book entitled "The Price of Petrol," by E. H. Davenport, published by the London General Press, 8, Bouverie Street, London, E.C.4, at one shilling, is of topical interest in view of the events in the petrol industry. In a simple, clear way the author discusses with an authentic knowledge the increasing demand for petrol, how it has been met, how the cost has been cheapened, and why fluctuations in prices must occur.

H.R.H. THE PRINCE OF WALES ON AIR TRAVEL

Speech to the Institute of Transport

H.R.H. THE PRINCE OF WALES attended the ninth annual dinner of the Institute of Transport, of which he is the honorary president, at the Savoy Hotel on March 14. Air Vice-Marshal Sir Sefton Brancker was in the chair. In the absence of the Lord Chancellor, the toast of "The Institute" was submitted by Sir Arthur Stanley, who said that the Institute was formed ten years ago, and immense success had been achieved, the membership now standing at 3,000.

The Prince of Wales received a great ovation when he rose to respond to the toast. In his speech he said that the Institute, though young in years, being only ten years old, could be justifiably proud of the influence it was exerting in the matter of transport. Transport had been rightly called the key industry, without which hardly any industry could flourish. Its branches, road, rail, water and air, each necessitated a different traffic science, and each abounded with problems of intense interest. Many of them were of high technical nature, and he knew that they would not ask an hon. president of that Institute—honorary generally meant that the man was apt to know nothing about those things—to discuss those technicalities at their dinner.

He had, he supposed, journeyed by every form of transport. Speaking of the progress of aviation, the Prince said that ever since the war it had been remarkable; and had proved of very great importance as a link between Great Britain and the Overseas countries. He did not know whether it was common knowledge that the England to India air service was about to begin at the end of this month.

With the exception of the short stage from Basel to Genoa, which would be done by night train, the whole route was by air, and the journey of over 5,000 miles from London to Karachi would be completed in little over 6 days. Both land machines and flying-boats would be used in the service, which would absorb the very successful Cairo to Basra service, which had been operating very successfully for nearly two years, and had attained a very high state of efficiency, and, still more important, regularity.

Then a weekly service from England to South Africa was being planned. That was the last place he visited, and he supposed that one was always more interested in the last place one had seen. It was a great Imperial project that would open up the heart of the great African Continent, and would reduce the time taken to reach places like Nairobi, Dar-es-Salaam, and Tabora by a full two-thirds. Northern and Southern Rhodesia would be brought to within ten days of London, whereas now the voyage and subsequent train journey necessitated three weeks of travel—as well he knew. Johannesburg, that wonderful mining city, and Pretoria, would be only 11 days away from this country instead of 18 or 19, whilst farther south the Union Parliament at Cape Town would be brought within 12 days of Westminster.

The Union Government had agreed to make a substantial contribution and lend full support and co-operation to the scheme, thereby enabling the Air Ministry to proceed with the arrangements for that very important Imperial service.

Many of them there that night, continued the Prince, could, as he could, realise the immense importance, from both the trade and the personal point of view, that the new service would be.

They were looking forward to regular air passages overseas. They especially remembered the individual efforts of our air pioneers who were making that progress possible. There were two great pioneers in 1919, both of whom were dead. One did fly the Atlantic, and the other very nearly did. Sir Alan Cobham had done some very fine pioneer flights. They had with them a very gallant lady—Lady Bailey—who flew alone to the Cape *via* the Sudan and the ordinary route back by the West Coast, covering 18,000 miles.

The first time he had the pleasure of meeting Lady Bailey was when jumping fences in Leicestershire. That was some time before she learned to fly. He could assure them that she flew over those fences better than any of them. Having been to the country which she had crossed, he could say that her achievement was one that very few of them would care to take on. They took off their hats to Lady Bailey.

Then there were others who had made air history. Mr. Bentley flew from London to Cape Town. He was told by the chairman that it was in order to get married. Well, that was a very good thing to do. He brought his wife all the way to London and then flew back again. That was a very fine performance. He would also, continued the Prince, like to mention Barnard and Alliott, who made a record flight from India to England in 4½ days. Then Mr. Murdoch flew from Lympne to Cape Town. And there was a very sporting effort of Capt. Rattray, the Provincial Commissioner in West Africa—a very fine climate West Africa.

He came on leave to learn to fly, and flew back to the Gold Coast in a Moth. While such a spirit of enterprise was being shown, and while such sporting efforts were being made, Great Britain could not worry very much about the possibilities of the air, or of transport by air. Long might they continue.

He would like to mention, continued the Prince, the wonderful use the Air Force was put to in Afghanistan. He could not do better than quote the last telegram of that very gallant Minister, Sir Francis Humphrys, which ran as follows:—

"The Royal Air Force have performed a historical achievement. They have conveyed 586 persons in 82 aeroplanes, without a single mishap to passengers, over mountainous country in the depth of winter at an average height of 10,000 ft. Conditions have always been difficult, and for the last two days almost insuperable on account of the heavy fall of snow."

That was a very great tribute to our Air Force. As a last striking illustration of the safety and efficiency of British air transport as it exists at the present moment, he would like to mention the fact that since the beginning of 1925 Imperial Airways had flown over 3,250,000 miles, or the equivalent of 131 times round the world, without a single accident involving the death of passengers. Transport was a very fascinating subject. Its greatest importance, to his mind, was its contribution to our national prosperity, and he was confident that the Institute, of which he was so very proud to be the honorary president, was performing a most valuable task in encouraging co-operation more than competition, and that it would continue to pursue its objects in the very best interests of the country.

Sir William Joynson-Hicks, M.P., Mr. J. H. Thomas, M.P., and M. Maurice Lippens, Minister of Communications (Belgium), responded to the toast of "Our Guests"; and Mr. Roger T. Smith submitted the health of the chairman.

The invited guests included:—Lord Ashfield, Lord Ritchie of Dundee, Lord Aberconway, Lieut.-Col. Piers Legh, Sir Samuel Hoare, Lady Bailey, Sir J. G. Beharrell, Sir Herbert Blain, Sir J. G., and Lady Broodbank, Sir William Currie, Alderman A. Emil Davies, L.C.C., Sir John and Lady Eaglesome, Mr. A. L. C. Fell, Brig.-Gen. P. R. C. Groves, Brig.-Gen. Sir Brodie Henderson, Sir Clement and Lady Hindley, Maj. G. E. Woods Humphreys, Sir George Humphreys, the Mayor of Lowestoft, Sir Henry Maybury, Sir Ernest and Lady Moir, Sir Charles Morgan, Lieut.-Col. A. H. L. Mount, Col. Sir Joseph Nall, Mr. F. Handley Page, Lieut.-Col. J. A. A. Pickard, Sir Felix Pole, Mr. and Mrs. R. H. Selbie, Mr. E. S. Shrapnell-Smith, Col. E. S. Sinnott, Sir Francis J. E. Spring, Sir Charles Strachey, Sir George Truscott, Sir Herbert A. Walker, Sir Ralph L. Wedgwood, Sir Henry White-Smith, and Mr. Stenson-Cooke.

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Air Minister on All-Metal Aircraft

SIR SAMUEL HOARE, speaking of aircraft at the "coming-of-age" dinner of the Institute of Metals on March 13, said that the new metal machines which had been substituted for the older wooden ones, in the case of land machines were 15 per cent. lighter, and in the case of flying-boats 25 per cent. lighter. One of his last flights was undertaken in a metal flying-boat, and he was told that the machine was almost a ton lighter than its wooden counterpart. Only three years ago the Air Ministry ordered in one year 392 wooden machines, against 21 metal ones. In 1928, on the other hand, they ordered 423 metal, against 63 wooden machines. By the end of this year they would have substituted metal for wooden machines almost entirely.

A "Genet" Success

THE Bayerische Flugzeugwerke A.G. have won the East Prussian competition with their BFW-M machine, fitted with an Armstrong-Siddeley "Genet" radial engine.

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¶ The highest speed ever accomplished in the air was achieved by Flight-Lieut. D'Arcy Greig in November last, when he covered three kilometres at the marvellous average speed of **319.5** m.p.h.

FASTEST ON LAND

¶ The highest speed ever attained on land was made by Major H. O. D. Segrave when he drove his Irving-Napier car over one mile at the amazing speed of **231.36** m.p.h.

WORLD'S GREATEST ENGINEERING RELIABILITY PERFORMANCE

¶ The greatest formation flight ever attempted was successfully accomplished with Napier engines. Four Supermarine ' Southampton ' flying boats, each fitted with 2 Napier engines, flew from England to Australia and back to Singapore, covering **180,000** engine miles, without mechanical trouble.

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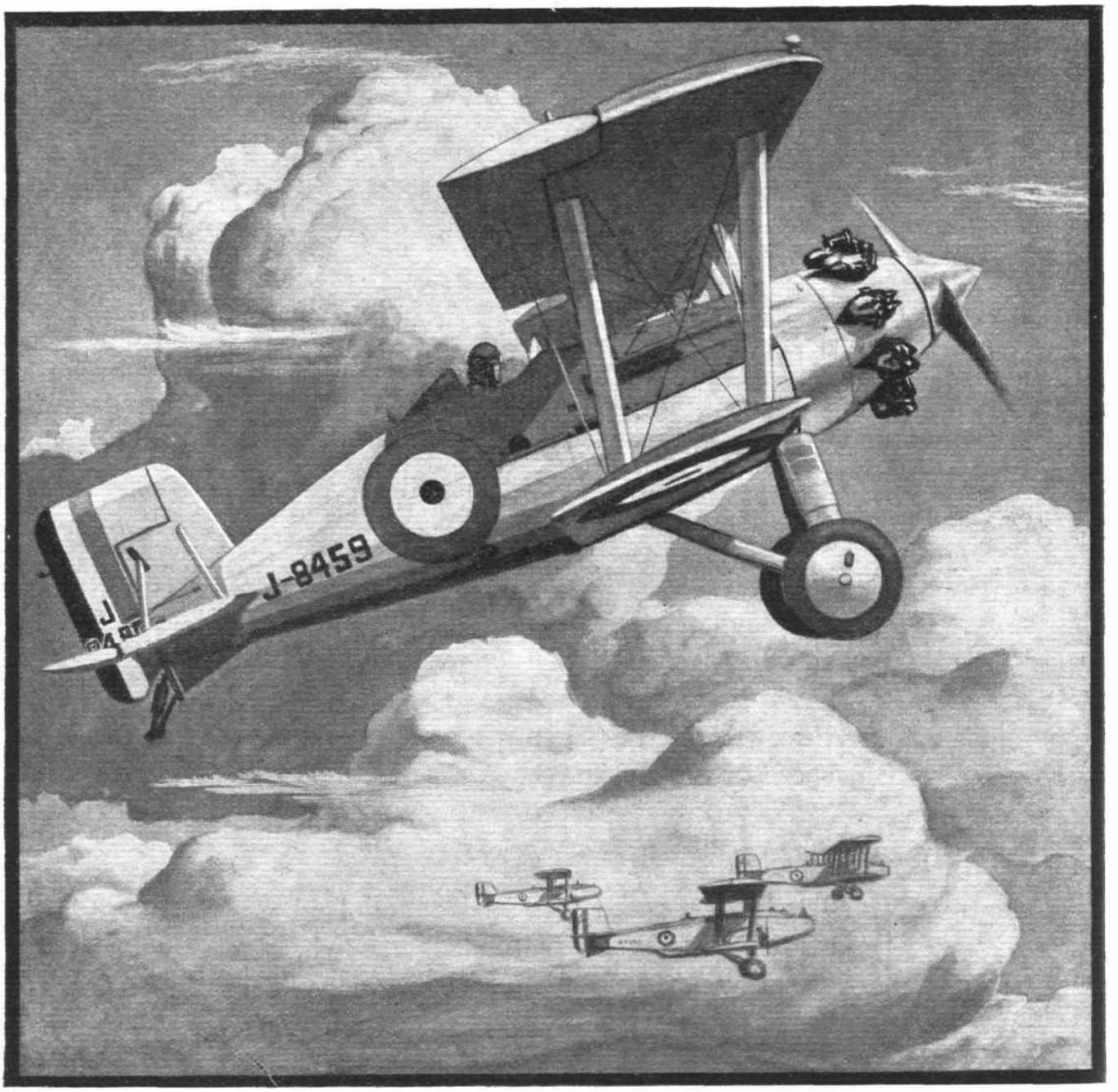

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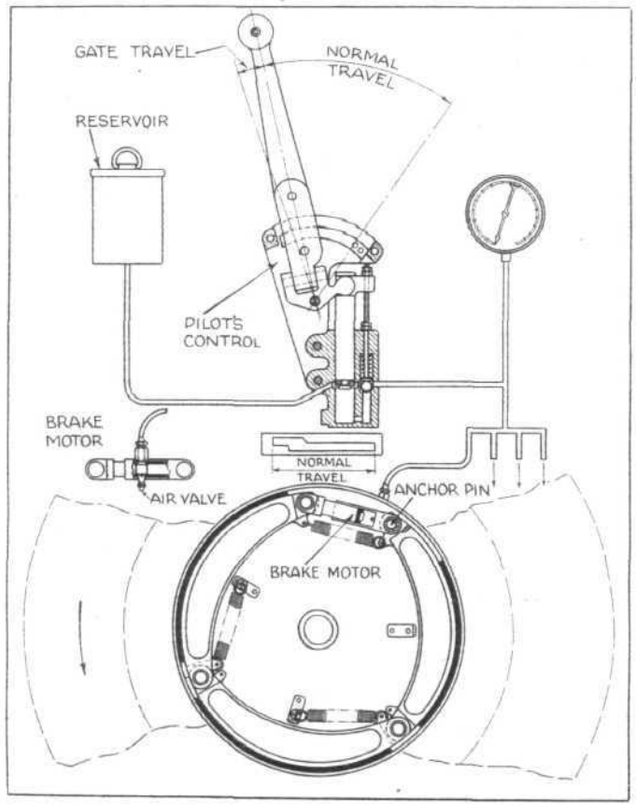
NEW VICKERS WHEEL BRAKES

Hydraulic System Adopted

IT is a somewhat curious fact that the aeroplane is the only high-speed transport vehicle not generally fitted with brakes. The distance which an aeroplane runs on landing, before finally coming to rest, is therefore unnecessarily long. Without brakes, the machine on landing may become unmanageable on sloping ground, and is also at the mercy of adverse winds. Landings during night flying and under emergencies would be rendered safer if brakes were fitted. Various schemes of braking have been tried in the past but experiments show that the best system consists of hand-applied brakes over which the pilot has full control. In this case it is essential that the brakes instantly respond to the load applied to the hand lever. It is also of the utmost importance that there should be instantaneous release.

Experiments with hydraulic transmission were begun by Vickers, Ltd., in 1924, and the system has now been perfected so that the pilot can, by his own unaided efforts, apply the



Diagrammatic representation of the new Vickers Hydraulic Wheel Brake for Aircraft

brakes to a machine weighing 18,000 lbs. and bring it to rest in less than 100 yards, when landing at 45 m.p.h.

The hydraulic system of transmission, of course, is not new, but has many advantages for this particular application, such as high efficiency, automatic compensation, self lubrication, adaptability, ease in installation and maintenance.

Two types of brakes have been developed by Vickers :— (*a*) Compensated brakes for twin engine machines ; (*b*) Steerable brakes.

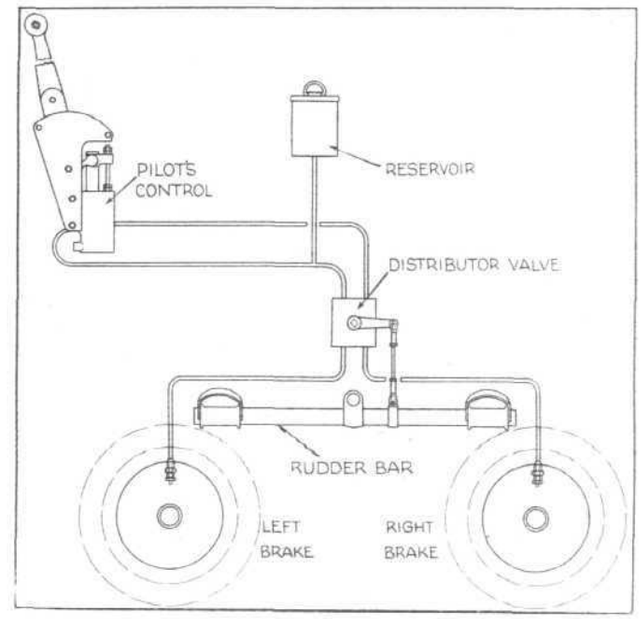
In the (*a*) type there is a pilot's control, which consists of a lever-operated oil pump with reservoir, the necessary pipe line and the brake unit mounted on the axle of each wheel.

In the case of the (*b*) type there is the addition of a special distributing valve coupled to the pilot's rudder bar, which enables the brakes to be used to assist steering on the ground. The two systems are indicated in the accompanying diagrams.

The action of the various components is as follows :—

The pilot's control is operated as a pump and raises the pressure in the system. The first stroke takes up all clearances and the second or third stroke gives maximum braking. The delivery valve holds the pressure in the system until it is raised to, say, 200 lbs. per sq. in.

This pressure gives slight braking. Any further increase of pressure puts the valve out of action, and the pilot's brake lever is then in direct communication with the brake shoes, so that the pilot can " feel " accurately the amount of braking. The action of braking is then similar to that of a car. On releasing the lever, the braking is reduced to a minimum, and complete freedom is obtained by pushing the lever forward and to the right through the gate. The



Vickers Hydraulic Wheel Brake, steerable type.

oil reservoir, which is connected to the pump suction, is kept three-quarters filled with oleo oil Vacuum P.924 which is a thin, non-freezing oil. The pipe line which connects the pump to the brake motors is of solid drawn steel.

The following sizes of brakes are in use :—

Machine weight lbs.	Number and size of wheels (mm.).	Diameter and width of brake ins.	Maximum retarding force at ground, lbs. per wheel.
2,850	2 at 650 × 125	12 × 1	400
3,170	2 at 750 × 125	12 × 1	450
3,600	2 at 750 × 125	12 × 1	500
19,500	4 at 1,100 × 220	18·5 × 1·75	1,200
and the following are being manufactured :—			
14,600	2 at 1,500 × 300	22 × 2·25	1,800
22,500	2 at 1,750 × 350	26 × 2·5	2,500

The brake unit comprises a three-shoe internal expanding servo brake, a hydraulic motor and anchor pin, all mounted on a disc secured to the axle, the necessary torque being taken through the axle or as may be arranged. The wheels are of the disc type, with brake drum integral with wheel. The brakes are efficiently protected against mud and water, and in no way interfere with the removal of the wheel. The pipe line connection to the brake motor is external, and the air valve, which need only be opened when refilling, is readily accessible. The adjustment of the brake stops can be done externally without removing the wheel. All plunger packings are self adjusting.

In the case of the steerable brakes, the special distributing valve is inserted between the pilot's control and the brakes. If differential braking is required, the movement of the rudder bar and the consequent movement of the distributor valve allows full braking pressure to be attained on the wheel which will be on the inside of the turn whilst the pressure on the outer wheel falls away to zero. When the rudder bar is returned to normal the brakes automatically

compensate themselves. A pressure gauge may be inserted in the system if desired.

The adoption of wheel brakes, it is claimed, gives advantages which may be summarised as follows :—Makes the machine safer on the ground, permits of the use of tail wheels, lessens the wear and tear of aerodromes and reduces number of ground personnel, permits of the use of roller bearing wheels which reduces upkeep costs and shortens the run to " take off."

Enables the machine to land and pull up in a smaller field. Braked run may be 50 per cent. of unbraked run. Gives to the single-engined machine the manœuvrability of a twin. Lessens the stresses in tail portion of fuselage owing to the abolition of tail skid. And finally the use of brakes enables higher landing speeds to be safely employed with the consequent increase in top speed and efficiency.

These brakes have been designed in collaboration with the Dunlop Rubber Co., Ltd., for use with their disc wheels, and with Palmer Tyres, Ltd., for use with their wire wheels.

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BOOK REVIEWS

"THE BAGHDAD AIR MAIL" *

THE story of the Baghdad Air Mail gives us an example of the useful work carried out by the Royal Air Force in addition to the normal service routine. The R.A.F. Squadrons who forged the trail of 866 miles between Cairo and Baghdad after the war, and conveyed the air mail for so long, have made possible the coming air service to India ; whilst their pioneer flights led to the present successful air services between Cairo and Basra, now run by Imperial Airways, Ltd. They fought all the hardships of that desolate land of the Arabs, blazing a track across the desert for guidance, laying down landing grounds and emergency petrol supplies, and conciliating the Arab tribes with their presence. So that, today, the services can be run in comparative safety and with great reliability.

The story of this pioneering in the desert has been told by Wing-Commander Roderic Hill, M.C., A.F.C., F.R.Ae.S. (Fellow of University College, London). Perhaps no one, who took such an active and valuable part in the work, was more fitted to be its historian. For he is as facile with his pen as with his pencil. He lived intensely during his experiences, as all artists do, and he can express himself with that sensitiveness to his surroundings as only artists can. The desert and the Arab nomads of the desert fascinated him, and he is not afraid to express his sheer wonderment and pure joy. It was, for the reviewer, a great pleasure to find a distinguished airman so eager to be sincere about his feelings. Like all artists, he is not blasé towards life. He has not that cold pose, like one to whom the riddle of all life is solved, and who finds no occasion for enthusiasm, sentiment and whimsicality.

Although he had then been flying for nine years or more, he could write about his air adventures, his little fears and his little joys, as though they were as fresh to him as they would be to a novice. It is this confession of humanity in Wing-Commander Roderic Hill which raises his book above the ordinary level of autobiographical literature.

He tackles his subject with a sweeping comprehensiveness. First he describes how they made the air mail route, then he paints some fine pictures of the country, and finally, in the form of a diary, he narrates his personal experiences. Essentially his story quickens when he is describing those flights between Cairo and Baghdad with the mail. Nights were regularly spent in the desert at emergency landing places, and personal encounters with the nomadic Arabian tribes were frequent. The electric atmosphere of those encounters is well drawn by the author. There were anxious moments for the crew of the Vickers " Vimy," or " Victoria," or " Vernon," when the tribes bore down upon them unexpectedly from a desert that had seemed empty to the gaze. This sudden springing from nowhere is a peculiar faculty of the Arab. But the tribes seemed more cheerfully curious than antagonistic towards the men from the West with their strange machine. They were mostly dangerous in their inquisitiveness towards the machine, and had to be tactfully restrained. Cigarettes, as usual, seemed to be the most effective bond of good relationship, although it was unwise to practise Western politeness as a host. If an Arab was offered a cigarette he would try and take the case as well !

Their sheikhs appeared to be very friendly to the airmen, and they would readily restrain the tendencies of the wilder followers. Altogether, one gets a pleasant impression of those nomads. They had to be treated diplomatically, of course, but when they were friends they seemed to be very amiable, chuckling schoolboys, always ready for a joke.

One of the most serious obstacles facing the organisation of the air mail service was the provision of a means of guidance for the pilots. Particularly was a guide necessary in the case of a forced landing, for the chances of finding a stranded machine which had been flying a theoretical course over the desert were remote. There were natural landmarks, of course, but they were considered too confusing. So it was decided that the track of the convoy cars across the desert was the best choice. This track, however, required constant survey and re-marking, but it was the ultimate solution of the problem. Much night flying was carried out, which enabled some pilots to make record flights between Cairo and Baghdad.

The peculiar atmospheric effects in those latitudes added to the difficulties of a pilot trying to follow an elusive track. A horizon would appear to wobble and mirages would place villages and pools in unexpected positions, which befogged a pilot finding his way.

It is impossible within the limits of a review to convey adequately a complete impression of the work of the Baghdad air mail. The book must be read. Readers will then be able to appreciate the splendid pioneering endeavours of the men and machines of those R.A.F. squadrons on one of the most vital air routes in the world.

* "The Baghdad Air Mail," by Wing-Commander Roderic Hill. Publishers, Edward Arnold and Co., 18s. net. (18s. 6d. post free, FLIGHT Offices).

"THE GREAT TRANS-PACIFIC FLIGHT" *

NOW that the story of the Trans-Pacific flight of last year has been written by the two leaders of the crew, one learns and appreciates how thoroughly it was organised with the means at their disposal, and what an experience was encountered.

It was certainly a great flight, and it was successful in spite of the natural pessimism expressed in America, which had been engendered by the disastrous Dole competition. The fight to obtain the necessary financial support, which Kingsford-Smith and Charles Ulm had, was as remarkable as the flight itself. And it was tinged with romance. Both cherished the dream of conquering the Pacific by air for many years, unbeknown to each other, and, simultaneously, both went about Australia vainly seeking assistance. Once they met and passed on without their mutual ambition being discovered. When they did amalgamate they carried out a record circuit of Australia in 1927 in a Bristol Tourer biplane, which was seven years old, fitted with a Siddeley " Puma " engine, which had already done 1,100 hours.

That flight drew Government and public support for the greater venture, and at last they were able to sail for America with reasonable optimism. But months of fluctuating fortune were suffered before the ambition was realised. They required a lot of money to organise the flight thoroughly They chose a Fokker monoplane, fitted with three Wright " Whirlwind " engines, and installed the best radio apparatus. Harry Lyon and James Warner, both Americans, one a skilled navigator, the other a skilled radio operator, were selected to complete the crew. Sir Hubert Wilkins sold them the machine (without engines) and treated his fellow countrymen generously, and the American Government kindly allowed three of their engines on order to be delivered at once to the airmen, because the factory could not cope immediately with new orders.

Then agitation arose in Australia and the Government asked them to abandon the flight and return home. Such were their financial circumstances that they had to agree,

* "The Great Trans-Pacific Flight," by Sqdn.-Ldr. C. E. Kingsford-Smith, and Flt.-Lt. C. T. P. Ulm, published by Hutchinson & Co., 12s. 6d. (13s. post free, FLIGHT offices).

AND THE NAME OF ALL THESE WAS AVRO

One morning, early, some twenty-one years ago, an aeroplane rose uncertainly into the air. It didn't stay there very long. Just long enough to make history. For until that moment nothing British had ever before left the ground. It was an Avro.

Three years later a seaplane made itself famous in just the same way. It was an Avro.

In 1917 the first aeroplane was evolved in which scientific flying instruction became possible. It was an Avro.

A year later, the R.A.F. were able to use for the first time one type of machine and one only for training pilots. This machine has been standard training equipment in the R.A.F. ever since. It was an Avro.

In 1919 the owner-flyer appeared ; the first modern light aeroplane took the air, and has, so to speak, stayed there ever since. It was an Avro.

Last year, light aeroplanes flew in record time from London to Berlin, from London to Australia, and from London to Capetown. They were Avros.

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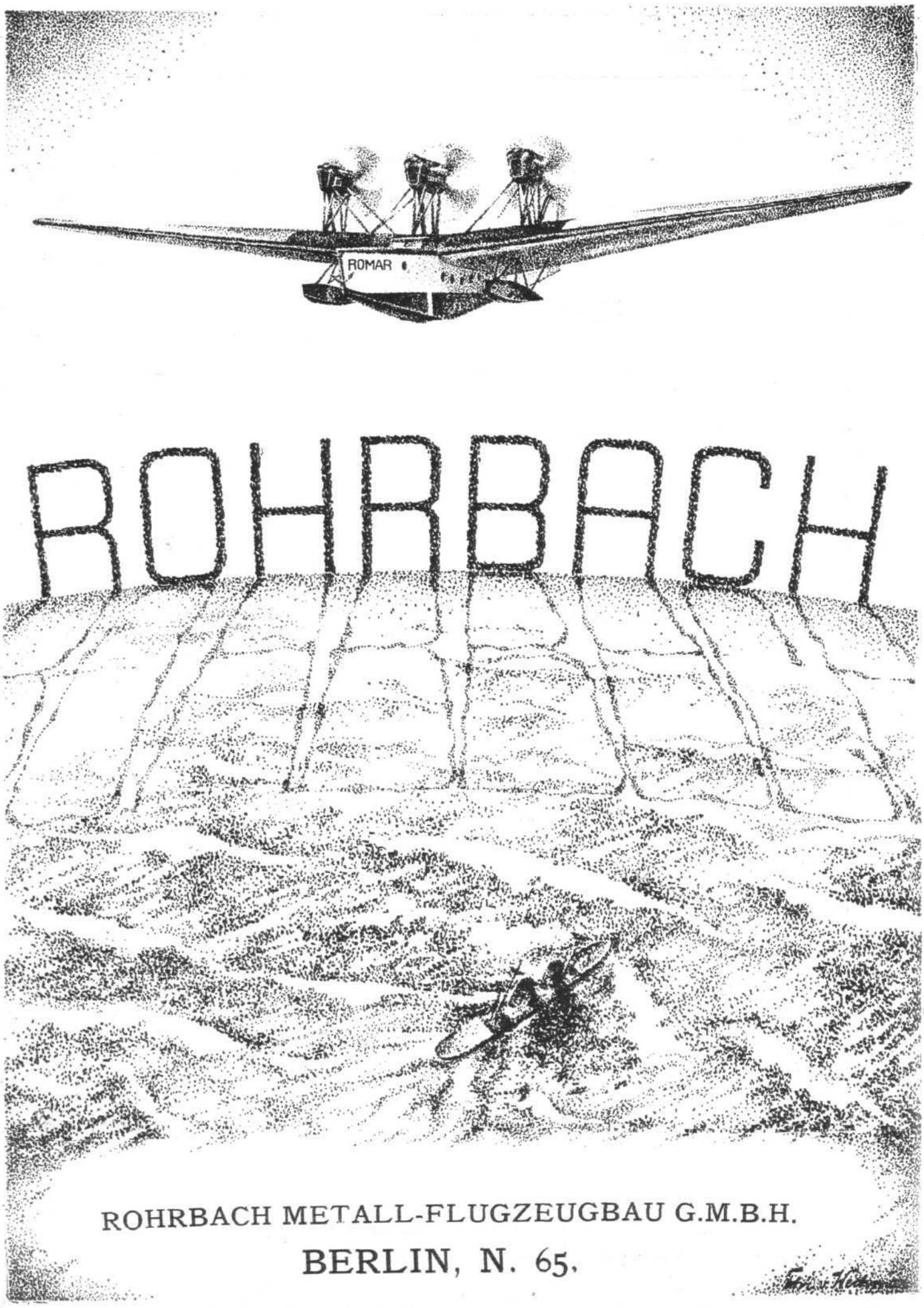
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BERLIN, N. 65.

and to meet pressing creditors they tried to sell the machine. But a stroke of fortune introduced them to a Capt. G. Allan Hancock, of Los Angeles, and through him they were able to start at the very period when their ambition seemed futile.

San Francisco to Honolulu

Such calm weather prevailed on the first stage of 2,408 miles to Honolulu from San Francisco that the flight was marked by monotony. The engines ran faultlessly, wireless communication was maintained adequately, and Lyon, the navigator, hit the group of islands with very little trouble. Their doubts about fuel consumption gave the only moments of anxiety, but proved quite unfounded. The 2,408 miles took 27 hrs. 25 mins. flying time. About 130 gallons of petrol remained over.

The next stage of over 3,000 miles to Suva was a sterner task. Storms encircled the monoplane for many hours, and there was one foreboding period when the starboard engine developed an intermittent cough, which could not be accounted for. Fortunately it soon cured itself and sang as merrily as before. Kingsford-Smith's previous cautionary practice at blind flying, the factor which caused many of the disasters to the Dole competitors, was of good avail. Again, apart from the ferocity of the storms, and that brief engine anxiety, their chief worry was the petrol consumption, about which the two pilots differed. But again they had a safe margin, and the longest stage of the whole flight was flown in 34 hrs. 30 mins.; the exact distance being 3,138 miles.

Suva to Brisbane

The last stage of 1,508 miles to Australia was the shortest, but it led to the apex of the epic struggle. First they made their only serious mistake in forgetting to oil the Earth Inductor Compass, so that it failed them soon after leaving Suva, and the ordinary compasses had to be relied upon. Again the engines ran superbly, but the storms, raging around them for hours in the darkness, menaced their lives.

The monoplane was caught when still heavily loaded and difficult to manœuvre. There reigned intense darkness which appeared impenetrable, and torrential rain which raged like a cascade immediately in front of the windscreen and poured into the pilots' cockpits. In the low temperature the engines began to lose revolutions, and through the furore they dived the monoplane, touching 150 miles per hour.

Navigation was impossible for some hours, but there stretched a coastline of 2,000 miles ahead. Although they were blown well off the course, and actually made a landfall 110 miles south off Brisbane, the performance was not bad in the circumstances. The entire distance of over 7,000 miles over the Pacific Ocean was accomplished in 83 hrs. 11 mins. flying time. Kingsford-Smith and Ulm are now contemplating a flight to England from Australia in the same monoplane.

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The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

REPORT of the Committee of the Royal Aero Club, March 13.

Present:—Lieut.-Col. M. O'Gorman, C.B., in the chair; Air Vice-Marshal Sir W. S. Brancker, K.C.B., A.F.C.; Griffith Brewer; Lieut.-Col. M. O. Darby, O.B.E.; Lieut.-Col. John D. Dunville, C.B.E.; Lieut.-Col. Sir Francis K. McClean, A.F.C.; F. Handley Page, C.B.E.; Maj. H. A. Petre, D.S.O., M.C.; Capt. C. B. Wilson, M.C.; H. E. Perrin, Secretary.

Election of Members.—The following new members were elected:—

H. S. Chamberlain.
Flight-Lieut. Nicholas Comper.
John Graham Dawson.
Flying Officer Erskine Arthur Hamilton Fisher.
Colonel Sir Joseph Reed.
Richard Keith van Sickle.
William Samuel Stephenson.
Flying Officer William Alfred Tattersall.
Sir Richard Tihel Leighton.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

8504	John Collier	Norfolk and Norwich A.C.
8505	Maurice Carey Wilks	Midland A.C.
8506	William Arthur Willcox	Liverpool and District A.C.
8507	Evan Cecil Francis ..	,, ,,
8508	Henry Dudley White-house	Lancashire A.C.
8509	Jack Vivian Audas ..	Singapore F.C.
8510	William Stanhope Rope	Norfolk and Norwich A.C.
8511	Richard Geoffrey Davies	Lancashire A.C.
8512	Henry Francis Mase	Hampshire A.C.
8513	Albert Kirkby ..	Norfolk and Norwich A.C.
8514	Arthur Senior ..	Yorkshire A.C.
8515	Ian Robertson Parker	Liverpool and District A.C.
8516	John Raymond Cuth-bert Quilter	Henderson F.C.
8517	Walter William Briscoe	London A.C.
8518	Percy Butler Lusk ..	Hampshire A.C.

Committee Reports.—The reports from the following committees were received and adopted:—Finance Committee; House Committee; Schneider Committee; Associated Clubs' General Council.

ANNUAL GENERAL MEETING

THE Annual General Meeting will be held at the club premises, 3, Clifford Street, London, W.1, on Wednesday, March 27, 1929, at 8.30 p.m.

Agenda

1. Chairman's Report.
2. To announce Result of Ballot for Committee.
3. To elect President and Vice-President for the ensuing year.

The following are recommended by the Committee:—

President: Brig.-Gen. The Duke of Atholl, K.T., G.C.V.O., D.S.O.

Vice-President: The Duke of Sutherland.

House Dinner.—A House Dinner will be held at the Club prior to the Annual General Meeting, at 7.30 p.m. The price of the dinner is 6s. Members wishing to attend are requested to notify the Secretary. Brig.-Gen. The Lord Thomson, Chairman of the Club, will preside.

Names of Members Nominated for the Nine Vacancies on the Committee.—1. Brewer, Griffith; 2. Darby, Lieut.-Col. M. O., O.B.E.; 3. Dunville, Lieut.-Col. J. D., C.B.E.; 4. Holden, Brig.-Gen. Sir Capel, K.C.B., F.R.S.; 5. Hubbard, Wing-Commander T. O'B., M.C., A.F.C.; 6. McClean, Lieut.-Col. Sir Francis K., A.F.C.; 7. Manning, W. O.; 8. Page, F. Handley, C.B.E.; 9. Sopwith, T. O. M., C.B.E.; 10. Wilson, Capt. C. B., M.C.

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3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

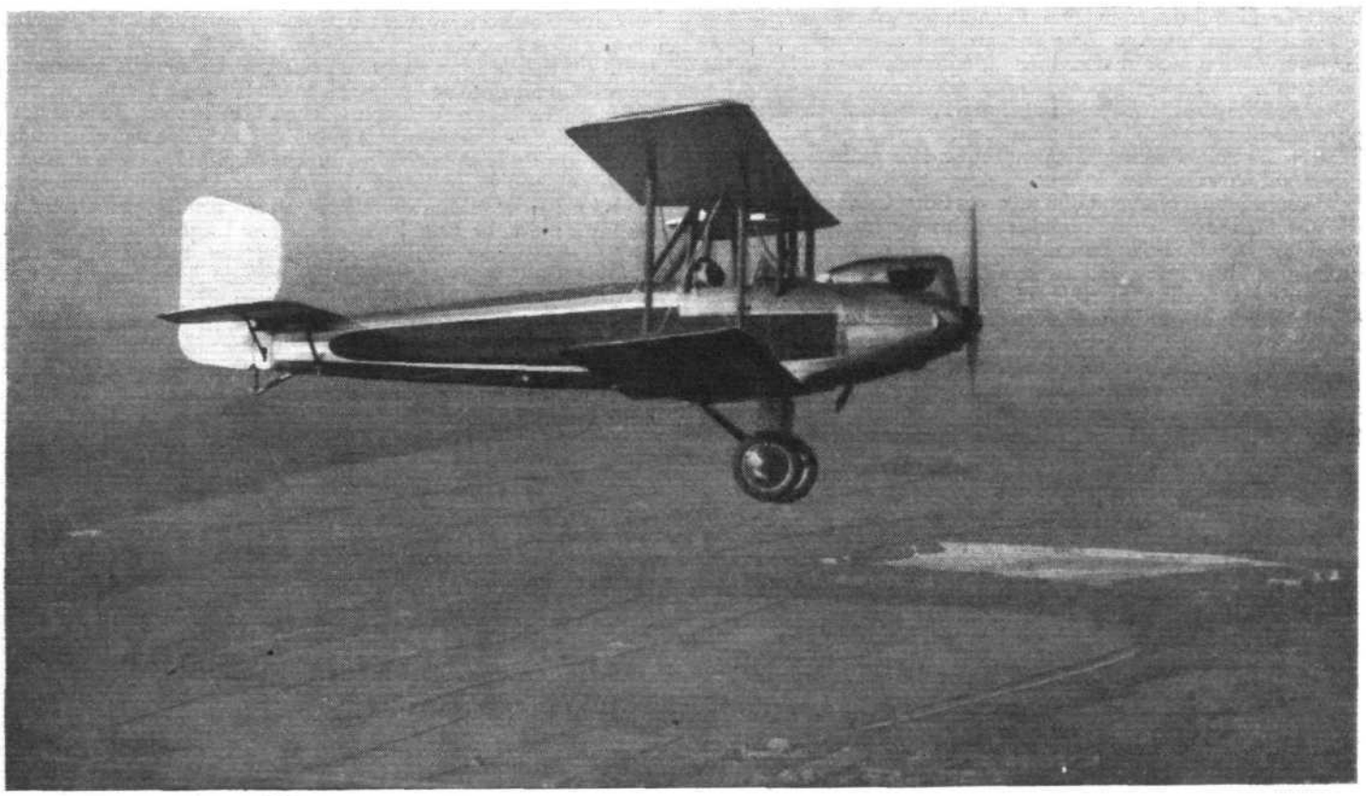
A.I.D. Dinner

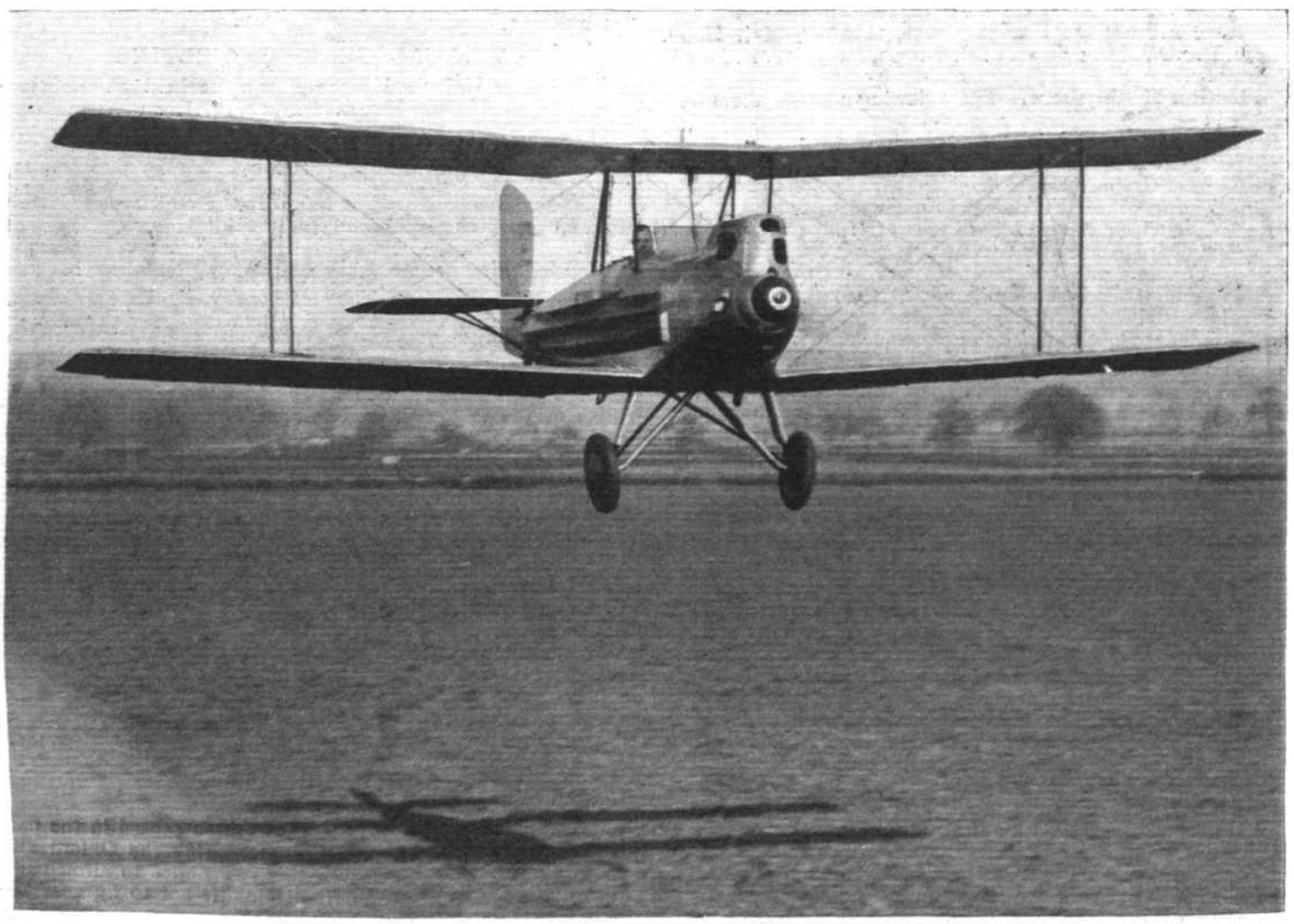
THE fourth annual dinner of the Aeronautical Inspection Directorate Technical Staff Association will be held on April 19 at the Hotel Russell, W.C. It is understood that a limited number of tickets are available for those connected with the industry at 10*s.* 6*d.* each, inclusive of wines. All applications should be addressed to Mr. J. Jarvis, A.I.D., Room 539, Alexandra House, Kingsway, W.C. 2.

Aircraft and the Boat Race

As considerable annoyance has been caused in the past by the low flying of civil aircraft during the Oxford and Cambridge boat race, an Air Ministry notice to airmen has been issued requesting pilots of aircraft not to fly near the course this year (on March 23) at a lower altitude than 2,000 ft., either when the race is about to start or during its progress.

SIDE BY SIDE



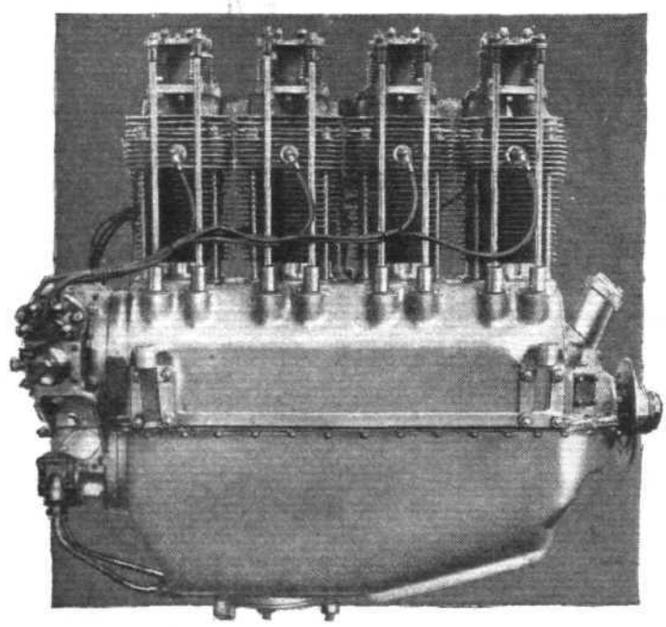


["FLIGHT" *Photographs*

THE BLACKBURN ALL-METAL "BLUEBIRD": This machine, described in "Flight" recently, has now been completed and is here seen in flight. The aerial view was secured from a Blackburn "Kangaroo."

RELIABLE

GIPSY

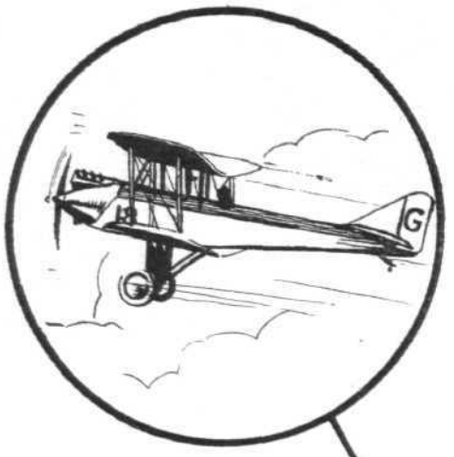


The de Havilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

The Wright Aeronautical Corporation, Paterson, New Jersey, U.S.A.

HUNDREDS IN WORLD-WIDE USE

Streets



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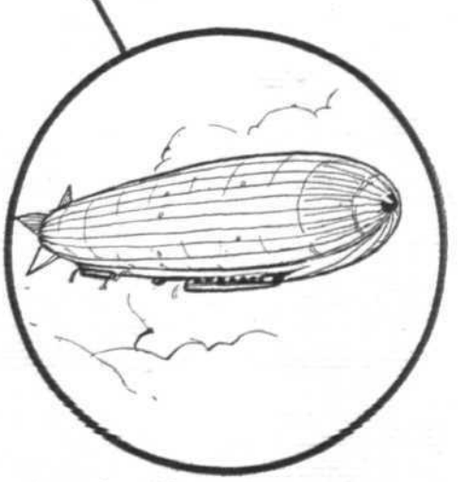

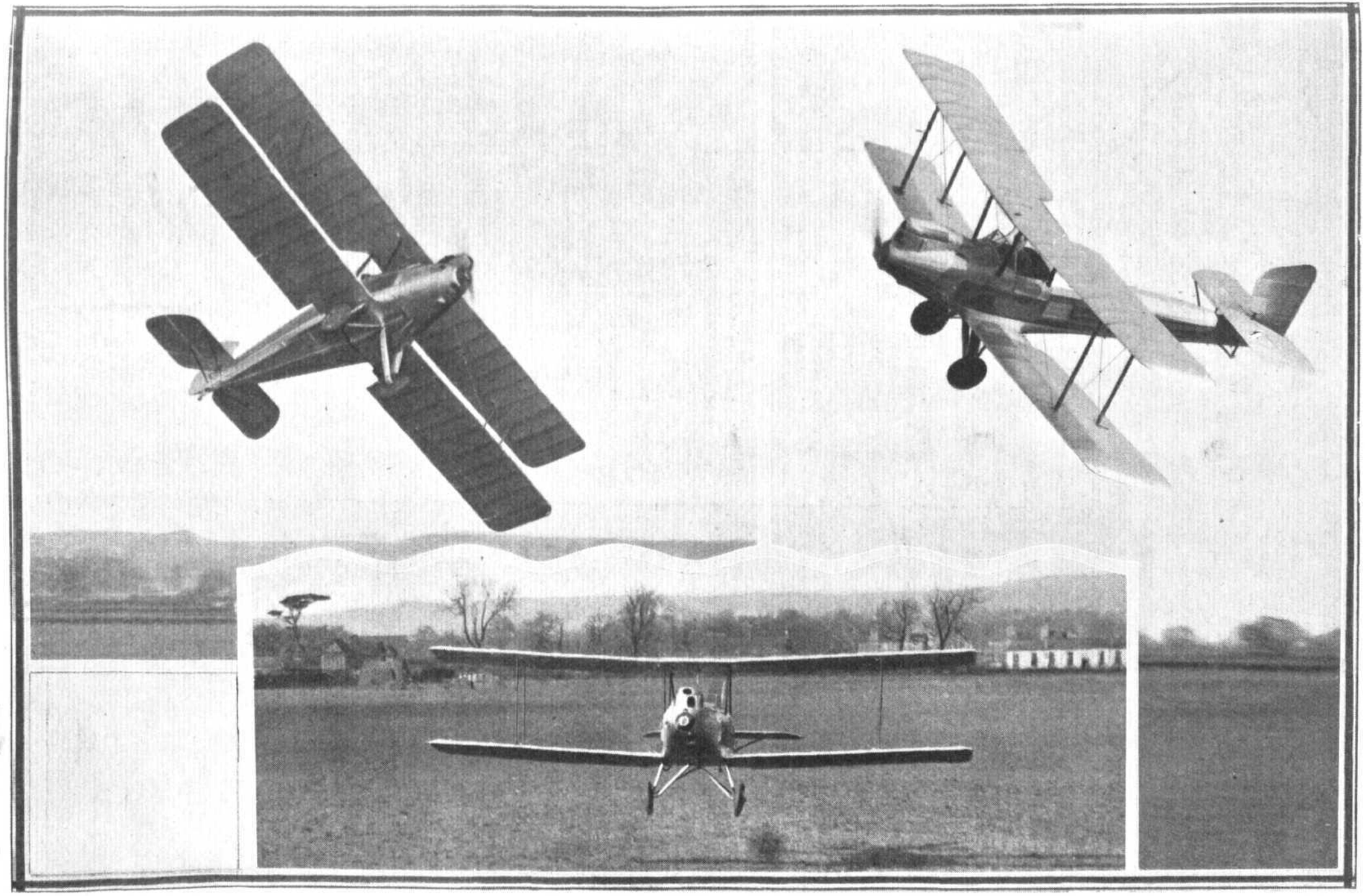

["Flight" Photographs.

CLEAN LINES: In spite of its side-by-side seating arrangement, the Blackburn "Bluebird" with "Cirrus III" engine has very pleasing lines and is probably very efficient aerodynamically. The pilot on this occasion was Capt. Blake, Blackburn's Chief Test Pilot.

EDDIES

WANDSWORTH Borough Council General Purposes Committee are apparently anxious to be left out of any scheme for the provision of aerodromes in the Metropolitan area, as they have protested strongly against the possible utilisation of land in the district for this particular purpose, inviting the Metropolitan Boroughs Standing Committee to back them up in their short-sightedness. Surely this is in the present day the exact opposite to the trend of opinion, which inclines to the centralisation of undertakings affecting the community generally, rather than allowing local bumbledom to stem the flow of progress by its circumscribed views. In aviation we have a further step in the direction of man's gradual annihilation of wasted time, and even Wandsworth can hardly expect to call a halt.

"ON MOMENTS GREATER THAN YEARS"

Your first "live-drop" just before the parachute opens.

GENERAL SIR IAN HAMILTON is no armchair critic He has known, does know and has done his job, so that when he speaks it is well for others to listen and take heed. At the anniversary festival function of the Royal Caledonian Schools, the other night, General Sir Ian reiterated that our Imperial forces were being cut down to the bone, England having gone further in this direction than any other of the Allied Powers.

"Taking things as they are," he said, "It may fairly be claimed that cutting down the estimates of the old Services and starving the new Air Force has not so far in any way damaged the true basis of our Imperial strength, the spirit of the officers and lower deck ratings of the Navy, or of the officers and rank and file in the Army. Air binds an Empire even more closely than the sea, but we have only six squadrons associated with the Territorials; we should have sixty."

IN this connection Mr. Bridgeman, when introducing the Navy Estimates, dealing with the reduction of armaments, very truthfully pointed out that if everybody's forces are reduced, their chances of success against any other power are just the same as they were before, and therefore the incentive to war remains the same. The real fact is that substantial fleets in the hands of peaceful powers are not a danger to peace where no war spirit exists, and the more proportionate reduction of armaments is no guarantee against war where the spirit of peace does not exist.

Adding: Some people approach this question in a kind of self-righteousness which is very repugnant, and with the assumption that they are the only people in the world who want peace. That is a most offensive assumption and totally untrue.

ALTHOUGH Mr. Bridgeman was speaking for the Navy it is obvious that the same argument applies to the Air Force.

LIKE unto the first flights on the new Eastern Air Route, by Imperial Airways, no passengers are to be carried in the first flights of the two big British airships when they take their trips across the Atlantic, although of course later on the intention is to at least carry passengers in the Airship Guarantee Company's vessel R.101.

QUITE a good suggestion comes from Mr. Richard Benyon with regard to special Air Customs Ports contemplated by the Government. This is that the port of Milford Haven with Pembroke Dockyard, which is now closed, should be brought to life again, as being of the greatest utility for communication to Ireland and America. Milford Haven would be an ideal place for building passenger flying-boats, and failing the Government moving in the matter it is suggested that Pembroke Dockyard could probably be rented at a low figure by a company interested in aircraft.

BY a coincidence it would appear as if Mr. Benyon's suggestion is likely to come into being, as subsequent to his letter it has transpired in Parliament in connection with the Navy Estimates that arrangements are already advanced for transferring Pembroke to the R.A.F. as a flying station to be used for training purposes.

IT is hardly surprising that following the very drastic report in regard to the handling of the ill-fated *Italia* airship, Signor Nobile, the General of Aeronautical Engineers, has formally resigned his rank and appointment, which has been accepted.

IT will be rather rough upon Imperial Airways if differences between Italy and Greece upon the selection of a Greek port of call—Athens is, it appears, objected to by Italy—in the England-India Air Mail Service which it is hoped to start on March 30, should cause a hold-up. It is to be hoped these international complications will be smoothed out by the end of the month, otherwise it looks as if a postponement of the start may have to be faced.

AEOLUS

A GREAT UNDERTAKING

As makers of the widest and most successful range of British aircraft and engines the Armstrong Siddeley Development Co. Ltd. is in a unique position to offer the results of its extensive experience on matters relating to air transport, training, fighting or private flying machines on land or sea in any part of the world.

Brief details of aircraft and engines are given below. Full particulars and prices may be obtained on application.

AIRCRAFT

AIRCRAFT FOR THE SERVICES

The Armstrong Whitworth All-Steel Atlas 2-seater Fighter or reconnaissance machine, fitted with an Armstrong Siddeley Jaguar engine and either wheels or floats.

The Armstrong Whitworth All-Steel Siskin 3.A. single seater Fighter fitted with an Armstrong Siddeley Jaguar engine.

The All-Steel A.W.A. 14 high performance Fighter fitted with an Armstrong Siddeley Jaguar engine.

AIRCRAFT FOR CIVIL PURPOSES

The Armstrong Whitworth Argosy. A 20-seater Airliner fitted with three Armstrong Siddeley Jaguar engines.

The Avro Commercial Monoplanes. A 4-5 seater or 8-10 seater both fitted with three Armstrong Siddeley engines.

The Avro-Avian. A 2-seater light aeroplane fitted with Cirrus or Armstrong Siddeley Genet engine and either wheels or floats.

AIRCRAFT FOR SCHOOL & CLUB PURPOSES

The Avro Gosport, fitted with Armstrong Siddeley Mongoose engine and either wheels or floats.

The Avro 504.N. fitted with Armstrong Siddeley Lynx engine and either wheels or floats.

The Avro-Avian, fitted with Cirrus or Armstrong Siddeley Genet engine and either wheels or floats.

ENGINES

THE LEOPARD

The Armstrong Siddeley 700-750 *h.p.* 14-*cylinder Leopard* for civilian use or for carrying troops or torpedoes.

THE JAGUAR

The Armstrong Siddeley 460-500 *h.p.* 14-*cylinder Geared Jaguar* for Civil or Service requirements. Jaguar engines have been in service on the London-Paris Airway for over three years.

The Supercharged 14-*cylinder Jaguar* is specially designed for maintaining power at high altitude.

Note.—The Armstrong Siddeley Geared Centrifugal Supercharger was the first device of its kind supplied to the British Government and has now been in use for three years.

THE LYNX

The Armstrong Siddeley 230 *h.p.* 7-*cylinder Lynx* as used on the Amsterdam-Batavia, Munich-Milan and other airways.

THE MONGOOSE

The Armstrong Siddeley 130-140 *h.p.* 5-*cylinder Mongoose* engine for training work on land or sea.

THE GENET

The Armstrong Siddeley 80-88 *h.p.* 5-*cylinder Genet*, an engine which is very much lighter than any engine in its class and is, therefore, particularly suitable for powering light aircraft.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.
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Head Office & Works: Coventry. London: 10 Old Bond Street, W.1

A. V. ROE & COMPANY LIMITED,
Newton Heath, Manchester
and 166 Piccadilly,
London, W.1.

THE AVRO TEN

A Three Engined Commercial Monoplane

The Avro Ten is a British version of the Fokker F.VII-3m., built under licence from the Fokker Company (N. V. Nederlandsche Vliegtuigenfabriek).

It carries eight passengers and is fitted with three 230 h.p. air-cooled Armstrong Siddeley Lynx engines.

Monoplanes of this type have attained a world-wide reputation for reliability, ease of maintenance and economy of running—qualities that have been proved during a period of several years.

They are used by the principal Dutch, Swiss and Italian Airlines.

Leading Features

ENDURANCE. 4 or 6 hours according to fuel capacity at a cruising speed of 96 m.p.h. with normal full load.

CONTROL. Complete dual control with side-by-side seating for pilots. Tail trimming gear allows large variation in the position of the centre of gravity.

CABIN. Dimensions 10′ ×5′ ×6′ with seats for eight passengers. Broad windows with wide angle views. Large door and direct access by fixed step.

BAGGAGE. Three compartments, total capacity 114 cubic feet.

FUSELAGE. Tubular steel with welded joints braced with steel struts and high tensile steel wire. Covered with fabric.

UNDERCARRIAGE. Special design of simple construction providing wide track. Rubber shock absorbers with special method of adjustment.

ENGINE MOUNTING. Of simple design permitting quick removal.

TANKS. Oil tanks fitted behind engines, fuel tanks fitted in wing providing simple gravity feed. Capacity with two tanks 150 gallons. With three tanks 225 gallons.

WING. Single unit of cantilever construction. Built of wood and covered with plywood to facilitate maintenance.

A. V. ROE & COMPANY, LIMITED
MANCHESTER

THE

LYNX ENGINE

A 7 Cylinder Air-Cooled Radial

The 230 h.p. Armstrong Siddeley Lynx engine has attained a world-wide reputation for reliability and ease of maintenance.

It was with Lynx engines that Lieut. Koppen flew his Fokker F.VII-3m. from Amsterdam to Batavia and back, covering 18,000 miles in 18 days. It was with Lynx engines that Fokker machines repeated the Amsterdam-Batavia flight with equal reliability last summer, and it was with Lynx engines that the difficult Munich-Milan Italian Airline and two new Airlines in Switzerland were equipped.

Lynx engines are used in more than twenty different countries, where their independence of climatic conditions have been amply proved. They have been used with equal success in Central Africa and within the Arctic Circle.

Fitted on Avro Aircraft they are the standard training engine of the British Air Force and are widely used for seaplane training. They are also used for two-seater reconnaissance machines, single-seater fighter aircraft, deck-landing aircraft and twin-engined seaplanes.

Many of their principal parts are interchangeable with those of the Armstrong Siddeley 14-cylinder Jaguar and 5-cylinder Mongoose engines. Where different types are in service this effects great economy in the storage of spares and general maintenance.

Leading Features

7 cylinders, 5" bore ×5.5" stroke.
Compression ratio 5 to 1.
Normal r.p.m. 1,900. Maximum r.p.m. 2,090.
Engine weight 513 lbs.
Direction of rotation, Left Hand Tractor.

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A

REMARKABLE PERFORMANCE

The Armstrong Siddeley Jaguar engines used by Imperial Airways Limited on the Argosies flying between London and Paris have set up a period of 400 hours between overhauls, the usual top overhauls having been discontinued altogether.

This achievement is claimed as a record of endurance, unsurpassed by any other engine in the world.

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SCOTTISH FLYING CLUB, LTD.

Report of Progress in 1928

A Successful Year

ON December 1, 1928, the Scottish Flying Club completed the first year of its official existence, and it may look back with a justifiable pride on a year of progress. The honour of founding the club undoubtedly goes to that small body of enthusiasts which, as the Scottish Flying Club Propaganda Committee, worked unceasingly for nearly two years in arousing public interest, collecting the necessary initial capital, gaining the official approval of the Air Ministry and surmounting the many technical difficulties which the floating of the club involved. By November, 1927, their work had resulted in the enrolment of 194 members, of whom 108 were in the pilot grade, and it appeared that sufficient enthusiasm had been created to justify an active start being made. Accordingly the club took delivery of its first D.H. "Moth" G-EBUU which, before being taken to Renfrew, was exhibited in a city warehouse for propaganda purposes. On December 3, active flying was commenced at Moorpark Aerodrome with G-EBUU and a D.H.51 machine, G-EBIQ, kindly lent to the club by its chairman, Air Commodore Jas. G. Weir, C.M.G., C.B.E.

The appeal which the movement had made was reflected in the very gratifying attendance of various representative bodies on the opening day, notably a party from the Corporation of the City of Glasgow, one of whose members, Bailie Mrs. Bell, honoured the club by becoming the first passenger to be carried in its machine. The interest which the Corporation of Glasgow and the several other important bodies have taken is a source of much gratification and forms a relationship of which the Club is justly proud. Flying activities continued to expand during the winter months until in February, 1928, the membership having risen to 251, it was found necessary to acquire a second D.H. "Moth" and G-EBVT was purchased. This had the effect of almost doubling the flying time, which, together with the improving weather, gave the Club a most encouraging advance, until in May, membership had increased to 295.

That month, however, proved unfortunate. The club suffered its first real accident, when G-EBUU was completely written off. Unluckily, at the same time, G-EBVT was out of action owing to being taxied into by another machine while standing on the aerodrome.

In June G-EBUU was replaced by G-EBYG and flying was again resumed. Good progress was made, and July saw the membership increased to 324. In that month, however, another set-back was experienced by G-EBVT being considerably damaged while searching for a missing competitor in the King's Cup Race on July 21. From July to September very little trouble was experienced, and the club made very steady progress both with regard to increasing membership and increased flying. By September the total membership had increased to 340, and, to cope with this, a third machine, the Avro "Avian" G-EBTY, was acquired. With the exception of further bad luck to G-EBVT, which was almost written off at the beginning of November, progress was practically unhindered to the end of the year on December 1, when the membership had reached the gratifying total of 363, composed of 181 pilot members, 31 observer members, and 151 associate members.

No Engine Trouble

During the year the club machines completed 2,597 flights, totalling 1,061 hours 25 minutes, which, considering the exceptionally bad weather of last year and the time lost through machines being disabled, was extremely satisfactory. It also speaks well for the careful maintenance of the club's equipment when it is pointed out that not once during the year was mechanical failure of any kind reported. Excellent progress was made in instructional work, as evidenced by the fact that 23 "A" Licences were awarded to *ab initio* members on account of club flying, which, together with the qualifications already held or granted on account of previous flying experience, brings the total qualified membership to 45 "A" licensed pilots and 6 "B" licensed pilots. Moreover, at the close of the year, 4 members had practically completed their "A" licence training.

While progress was made in flying matters, the social side of the club was not neglected. In March, plans were drawn up for the extension of the existing clubrooms at the aerodrome, and those, together with the erection of a permanent office, were completed in time for use on the occasion of the King's Cup Air Race in July. From then onwards gradual additions were made to furnishing and equipment. In that connection it is to be noted that, while it is intended to have the present clubrooms made as attractive as possible, it is not considered prudent to expend too much on them in view of a possible termination of tenancy in two years' time. In January, the club held its first dance in the "Waldorf," Glasgow, and the success of the venture led to further dances in February, March, and October.

Successful Finance

From a financial point of view the remarkable development of the club has been extremely sound. Beginning in December, 1927, with a capital of £1,496 13*s.*, raised by public subscription, this sum had been increased to £3,544 1*s.* 4½*d.* at the end of its first year, composed of further donations of £735 15*s.* 9*d.*, and the remainder of £1,311 12*s.* 7½*d.*, raised by the club's own efforts. Moreover, during the year the

SCOTLAND'S FIRST LADY AIR PILOT: Miss Janet Hendry, of Crosslees, Thornliebank, Renfrewshire.

club earned £1 602 15*s.* in Government Subsidy out of a possible £2,000.

Apart from its material assets, which, at the close of the year, were valued on an extremely conservative basis at £2,137 19*s.* 9*d.*, the club possessed a reserve of cash, invested in Trustee securities, of £2,155 14*s.* 6*d.* The total liabilities outstanding at the date of balancing were £131 15*s.* 0½*d.*, and these were practically set off by various deposits lodged with aircraft manufacturers, etc., amounting to £102 7*s.* 7*d.* Moreover, apart from actual deposits £476 was due to the club in respect of unpaid subsidy, accrued investment interest, and general debts. It should be pointed out also that in drawing up the first year's accounts preliminary expenses incidental to floating the club, amounting to £95 15*s.* 6*d.*, have been completely written off and also that no credit has been taken for unexpired portions of aircraft insurances.

This exceptionally sound state of the club's finances is not due to an exorbitant scale of flying charges, which it is the aim of the committee to keep as low as possible, consistent with good finance. The position is entirely the direct result of much enthusiastic work put in by the club in organising various capital raising ventures, chief among which may be mentioned the Garden Fete held at Crosslees House, kindly placed at the club's disposal by Mr. Robert Hendry, the visit of the Imperial Airway's Air Liner, and the handling of the arrangements at Renfrew in connection with the King's Cup Race.

While satisfaction must be expressed at the results achieved in the first year of the club's existence, it must be remembered that, in view of the possibility of having to leave Moorpark Aerodrome at the close of the present agreement, and also in view of the discontinuance of the subsidy in two years' time, much support will be required from club members, and from that air-minded section of the public who believe in the club, and who appreciate the national importance of its work, if the good work already done in the first year is to be consolidated and such a position built up as will enable the club to view the future with equanimity.

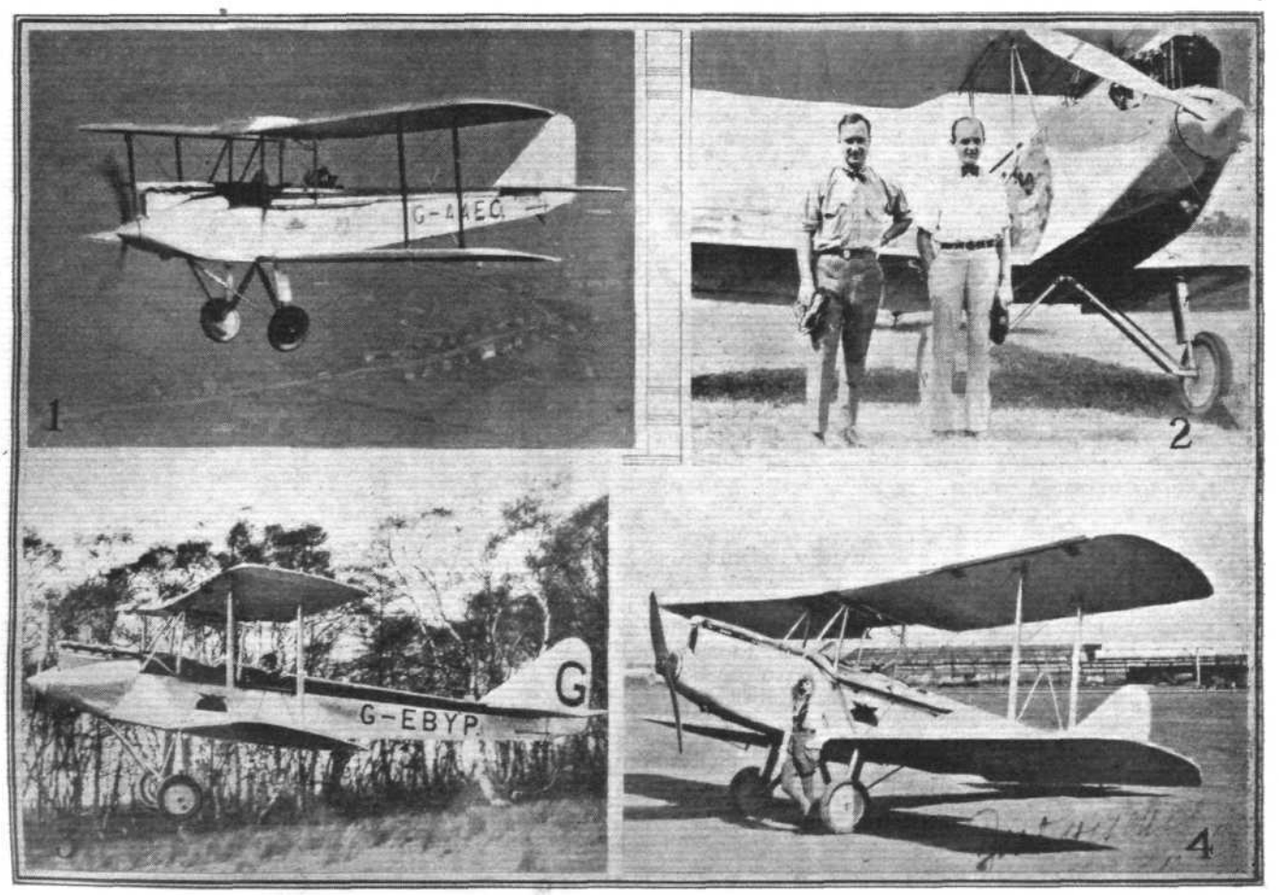
DEMAND FOR AVRO "AVIANS"

Manufacturing Abroad

THE Avro "Avian" is attracting a world-wide market, like other British light aeroplanes. The "Avian" agents for Queensland, Aircrafts Proprietary, Ltd., of Brisbane, are very busy demonstrating the utility of the light aeroplane. One of their "Avians" was recently chartered by a General Motors' official for a tour of dealers, which would normally have taken two weeks by travel over rough roads. The round trip of 1,500 miles by "Avian," however, was covered in a week-end of 16 flying hours.

There are some "Avians" which are almost historic relics. Such is one which Lady Heath flew solo from Cape Town, South Africa, to London, and which she eventually sold to Miss Amelia Earhart, of trans-Atlantic fame. Since then, Miss Earhart has flown it from the Atlantic to the Pacific coast and back. An amusing story of this veteran machine comes from America. It seems that it was exhibited at the New York Aviation Show in February, with a placard describing its adventures, including the words "Lady Heath flew it from Cape Town to London and Return." A few days later, visitors to the exhibition observed that the words "and Return" had been struck out in pencil and the following note added: "One way was enough! Sorry.—S. Mary Heath."

Miss Lya de Putti, the Hungarian film star, is an owner of an "Avian," which she purchased in America. Miss de Putti is at present making films in England, and she intends



AVRO "AVIANS" AT HOME AND ABROAD: (1) The Lancashire Aero Club's new Avro "Avian" flying over Woodford Aerodrome during the acceptance test by Mr. Hall, Chief Instructor. Note the new type undercarriage. (2) Mr. R. S. Adair (left), a pilot of Aircrafts Proprietary, Ltd., with the official of General Motors Acceptance Corporation, at the conclusion of their 1,500 miles tour of Queensland, Australia, in an Avro "Avian." (3) A very good close-up of a stalled landing on the "Avian" fitted with Handley Page slots. (4) Miss Lya de Putti, the Hungarian film star, nestling to her own "Avian" at the Grand Central Air Terminal, New York. She is now in England and is sending to America for her machine.

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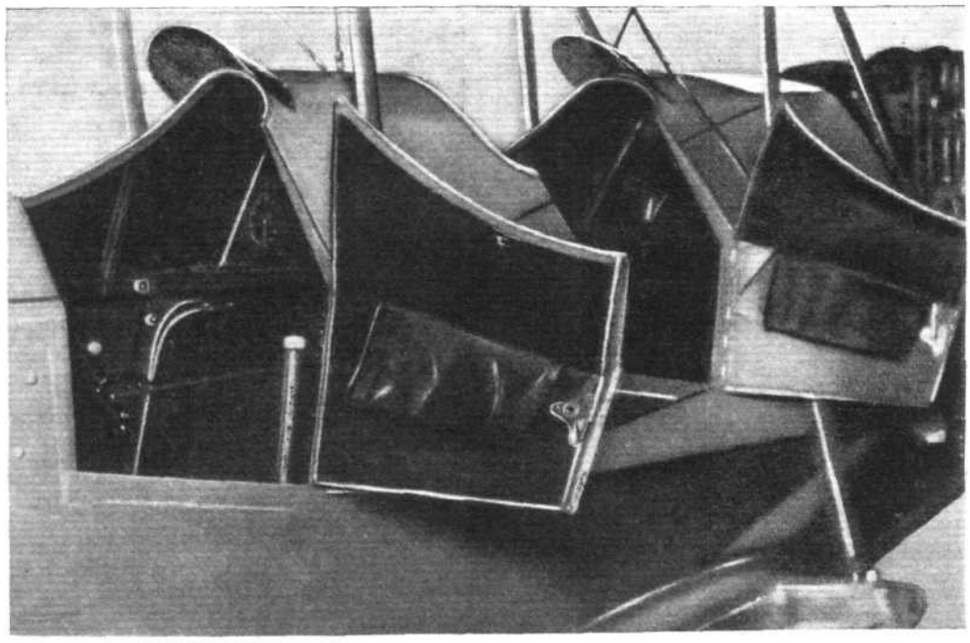

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to have her machine sent over so that she can use it in England during the summer.

Two of the newest markets for "Avians" are Mexico and China. Fourteen have already been despatched to China and two to Mexico, while two more for Mexico will follow within a few weeks.

"Avians" are now manufactured in Canada and the United States. The licence for Canada is held by the Ottawa Car Manufacturing Co., Ltd., of Ottawa, who are concentrating on the "Avian" with metal fuselage. Pending the completion of their plant, the first 25 machines are being shipped from the Manchester factory in a dissembled condition. Ten of these, fitted with Armstrong-Siddeley "Genet" engines, are for the Canadian Air Board. Two more will go direct to the Ottawa Flying Club. "The "Avian" metal fuselage is built entirely of round-section steel tubing with welded joints throughout. The engine mounting is a separate unit attached to the front of the fuselage by bolts, the same attachments suiting either "Genet" or "Cirrus" mountings. The Whittelsey Body Company, of Bridgeport, Connecticut, are making preparations to build the "Avian" for the United States. Until their plant is complete, six Cirrus-Avians are being shipped from the Manchester works every week.

The Lancashire Aero Club has just purchased another new "Avian" which has the latest type undercarriage.

Incidentally, A. V. Roe & Co., Ltd., have received an order for four Avro Ten commercial monoplanes from Australian National Airways, Ltd., of Sydney, Australia. It will be recollected that the A. V. Roe & Co. hold the manufacturing licence for the Fokker F.VII-3m, the design of which has been closely followed in the design of the Avro Ten. This machine carries eight passengers and two pilots, wireless, cabin heating and lighting and has three baggage compartments. The closest attention is paid to the comfort of the passengers, the cabin is tastefully decorated and comfortably furnished. Each machine is powered with three Armstrong-Siddeley "Lynx" engines. It is expected that one of these monoplanes will be shown at the International Aircraft Exhibition which is to be held at Olympia in July next.

LIGHT 'PLANE CLUBS

London Aeroplane Club, Stag Lane, Edgware. Sec., H. E. Perrin, 3, Clifford Street, London, W.1.

Bristol and Wessex Aeroplane Club, Filton, Gloucester. Secretary, Major G. S. Cooper, The Aerodrome, Patchway, Glos.

Cinque Ports Flying Club, Lympne, Hythe. Hon. Secretary, R. Dallas Brett, 114, High Street, Hythe, Kent.

Hampshire Aero Club, Hamble, Southampton. Secretary, H. J. Harrington, Hamble, Southampton.

Lancashire Aero Club, Woodford, Lancs. Secretary, Mr. Atherton, Avro Aerodrome, Woodford.

Liverpool and District Aero Club, Hooton, Cheshire. Hon. Secretary, Capt. Ellis, Hooton Aerodrome.

Midland Aero Club, Castle Bromwich, Birmingham. Secretary, Maj. Gilbert Dennison, 22, Villa Road, Handsworth, Birmingham.

Newcastle-on-Tyne Aero Club, Cramlington, Northumberland. Secretary, J. T. Dodds, Cramlington Aerodrome, Northumberland.

Norfolk and Norwich Aero Club, Mousehold, Norwich. Secretary, G. McEwen, The Aerodrome, Mousehold, Norwich.

Nottingham Aero Club, Hucknall, Nottingham. Hon. Secretary, Cecil R. Sands, A.C.A., 30, Park Row, Nottingham.

The Scottish Flying Club, 101, St. Vincent Street, Glasgow. Secretary, George Baldwin, Moorpark Aerodrome, Renfrew.

Southern Aero Club, Shoreham, Sussex. Secretary, Miss N. B. Birkett, Shoreham Aerodrome, Sussex.

Suffolk Aeroplane Club, Ipswich. Secretary, Maj. P. L. Holmes, The Aerodrome, Hadleigh, Suffolk.

Yorkshire Aeroplane Club, Sherburn-in-Elmet, Yorks. Secretary, Lieut.-Col. Walker, The Aerodrome, Sherburn-in-Elmet.

LONDON AEROPLANE CLUB

(MARCH 10—16).—Instructors: Capt. V. H. Baker and Capt. F. R. Matthews. Ground engineers: C. Humphreys and A. E. Mitchell. Aircraft: The following machines were in commission during the week:—G-AABL, G-EBXS, G-EBZC.

Total flying time: 31 hrs. 30 mins. Dual instruction: 27 members received dual instruction during the week, the time being 20 hrs. 50 mins. Solo flying: 16 members flew solo during the week, the time being 10 hrs. 40 mins. Easter flying: The club will be open during the Easter holidays, including the Bank Holiday Monday, April 1. The club will be closed for the day on Wednesday, April 3.

Presentation Clock.—We have again to thank Mr. J. Scott Taggart for a further presentation to the club. Following his gift of a D.H. "Gipsy" Moth, he has now installed in the Club House, a synchronome electric clock. Pilot instructor: Members will be sorry to learn that the club will shortly be losing the services of the Chief Pilot Instructor, Captain V. H. Baker, M.C., A.F.C. Captain Baker has taken up a position with Messrs. Norman and Muntz, who will shortly be commencing operations at the new aerodrome at Heston on the Great West Road. Captain Baker is the ideal of what a club pilot instructor should be. He is never happy unless he is in the air, and in the very short time he had been with the club (he only joined us in August last) he has instilled this "air sense" into the members, and the flying hours have shown a very marked increase.

The association of Baker and Matthews and pilot instructors has been a happy one both for the club and the members, and the departure of our chief pilot instructor—just as the flying weather is coming along—will be a very serious loss to the club. Captain Baker will take with him the good wishes of all members in his new appointment. The question of the successor is now being considered by the committee.

BRISTOL & WESSEX AEROPLANE CLUB, LTD.

(MAR. 10—16).—Pilot instructor: E. B. W. Bartlett. Ground engineer: A. W. Webb. Machines in commission (2): YH and TV. Flying time for the week, 24 hrs. 10 mins. Pupils under instruction and hours flown (5), 7 hrs. 30 mins.; soloists under instruction and hours flown (4), 7 hrs. 30 mins.; number of "A" pilots flying and hours flown (4), 6 hrs. 35 mins.; number of passengers carried and hours flown (1), 15 mins.; number of test flights and hours flown (10), 50 mins.

A good week for flying, and both our machines in commission again. We are grateful to the Liverpool & District Aero Club for their suggestion that our recent magneto troubles might have been due to rich mixture. This, however, was not the case as with them. New magnetos have immediately put things right. We are in no need of proving "beyond dispute" the efficiency of our ground staff, as this has never been in dispute. Mr. E. S Housley, an ex-R.A.F. war pilot, joined the club during the week, and after 75 mins. dual carried out the necessary solo, and would have passed his "A" licence tests with the minimum three hours' flying within three days of joining but for foggy weather at the last moment. Mr. J. H. Wells, from Oxford, joined us this week and is now busy with "B" licence work. Messrs. Keeling, Davis, and Heaven should manage their "A" tests very early now. Mr. Downes-Shaw, after three times having to come back on account of fog encountered on his route on the 15th, started for Algiers in ST on the 16th. We are arranging a competition for the Desprez Cup on May 26, details of which will be found elsewhere in this issue. All private owners and club members on club aircraft are cordially invited to compete, and with over two months' notice we hope there will be a large entry.

CINQUE PORTS FLYING CLUB

(MAR. 10—16).—Pilot instructor: Maj. H. G. Travers, D.S.C. Ground engineer: Mr. R. H. Wynne. Machines: R.I. and N.N. Total flying time for week, 55 hrs. 55 mins.

Dual Instruction:—Mrs. Travers, 15 mins.; Maj. Parminter, 45 mins.; Mr. Woods, 15 mins. Total, three members: 1 hr. 15 mins.

"A" Pilots:—Mr. Somerset, 1 hr. 45 mins.; Mr. West, 30 mins.; Mr. Worsell, 30 mins.; Mr. R. Dallas Brett, 45 mins.; Mr. Douglas, 1 hr. Total, five members: 4 hrs. 15 mins. Tests, 10 mins. Low clouds and extreme cold again interfered with flying at Lympne this week, but Maj. Parminter, of the Manchester Regiment, began instruction and is getting on well.

Easter Flying Meeting:—The entry lists closed on Friday last with the splendid total of 40 machines, which is very many more than were present last Easter. Amongst the celebrated pilots whom we hope to see at Lympne are: the Hon. Lady Bailey, who has just achieved, single-handed, the first circuit of Africa by light aeroplane; the celebrated Dutch pilots, Mijnheeren Vlaming, Pander, Redele, and Nieuwenhuizen; Mr. Dudley Watt with his famous 300 h.p. single-seater racer; and the two most famous English stunt pilots, Capts. Neville T. Stack, A.F.C., and Hubert S. Broad, A.F.C. Capt. Broad is the present holder of the world's records in the light aeroplane class for speed and endurance.

There are no less than 25 entries for the "Alight at Lympne" Rally, for the Hythe Chamber of Commerce Cup, competitors coming from, amongst other places, Rotterdam, Liverpool, Newcastle, Wokingham, and Bristol. The "Private Owners' Race" has attracted nine entries, including one Dutch pilot of an English machine. The "Manufacturers' Scratch Race" for Sir Charles Wakefield's 20-guinea cup has produced four entries from three different manufacturers, and, although the entries are few, this should prove a very close struggle between the de Havilland Gipsy Moths and the Simmonds Cirrus Spartan, a new type of machine of which much is expected, and which will be flown by Lieut.-Col. L. A. Strange, D.S.O.

If the weather is only kind, the club confidently anticipates that this meeting will be the finest aviation meeting ever held at Lympne, and the club can guarantee the public a very fine entertainment at a very low price.

HAMPSHIRE AEROPLANE CLUB

(MAR. 10—15).—Pilot instructors: Flight-Lieut. F. A. Swoffer, M.B.E., and Mr. W. H. Dudley. Ground engineers: Mr. E. Lenny and Mr. J. Elliott. Aircraft: D.H. 60 Moths G-EBOI and OH, and Avro Avian G-EBVI. Flying time, 49 hrs. Pupils under instruction, 17; hours flown, 19 hrs. 30 mins. Soloists, 10; hours flown, 11 hrs. "A" pilots, 10; hours flown, 12 hrs. 35 mins. Instructors, solo and tests, 15; hours flown, 2 hrs. 50 mins. Passengers, 12; hours flown, 2 hrs. 45 mins.

Notes:—Messrs. Milford and Hicks completed successful first solo flights, not that we expected them to do otherwise, but you never know what may happen when that annoying head in the front cockpit has gone. Messrs. Westlake and Roskill completed their flying tests for the "A" licence, bringing the 1929 total to six. Mr. Storey passed his figures of eight tests.

On Sunday five selected candidates for the Air League Flying Scholarship were given trial flights. The successful candidate was Miss G. M. Grace of Alverstoke, and she has now commenced dual instruction. We trust that at least some of the unsuccessful candidates will join the club.

Mr. Dudley and Mr. Lenny flew to Stag Lane on Monday in OH, changed the engine into OI, and returned to Hamble on Tuesday. On Thursday evening Messrs. Lenny and Elliott took the engine out of VI for a top overhaul, and the machine was flying again first thing on Saturday morning. We consider that this is indicative of the keenness and efficiency of our ground engineers.

LANCASHIRE AERO CLUB

(MAR. 10—16).—Flying time, 31 hrs. 35 mins. Instruction (17), 9 hrs. 10 mins.; solo flights (20), 14 hrs. 15 mins.; passenger flights (30), 6 hrs.; tests (14), 2 hrs. 10 mins.

Instruction.—With Mr. Hall:—Messrs. Cohen, Maxwell, Williamson, Sellers, Russell, Goss, Stern, J. G. Nelson, Kay, Paddock, Hey, Whitehouse, Wilkinson, Garner, R. G. Davies, J. H. Ashworth. With Mr. Cantrill:—Mr. Kay.

Machines in commission: MQ, EC, QL. Soloists (under instruction):—Messrs. Williamson, Sellers, Goss, Garner. Pilots:—Messrs. Goodfellow, R. F. Hall, Cohen, Ruddy, D. Nelson, Mills, Twemlow, Lacayo, Weale, Gort, Michelson, Kay, Hay, Whitehouse, R. G. Davies, Meads.

Passengers: With Mr. R. F. Hall:—Mrs. Mercer, Mr. Ormerod, Mrs. Davies, Messrs. Allott, Glover, Kennedy. With Mr. Mills:—Messrs. Cliffe, Yeoman, Miss Jones, Messrs. Newman, Clewes. With Mr. Goodfellow:—Messrs. Mills, Mitchell, Miss Rosebury, Miss Clair, Mr. Rivers, Miss Taylor, Miss Fielder, Mr. Juan. With Mr. Hay:—Messrs. McLeod, Juan, Mrs. Juan, Miss Sewell, Miss Laycock, Miss Tiller. With Mr. Brown:—Mr. Rivers. With Mr. Williams: Mr. Hazlewood. With Mr. Meads:—Mr. Richards. With Mr. Hall:—Miss Snowball, Miss Gaskell.

Weather fine but foggy. QL only came back into the fold on the last day of the week, but, despite this, over sixty members of the club and their friends were in the air during the week.

Mr. Will Hay was in Manchester this week and brought along a number of friends to fly, including Mr. Tex McLeod and Miss Gladdy Sewell, of variety fame, and a number of members of Cochran's Revue. We are indebted to A. V. Roe and Co., Ltd., for the loan of G-EBYP on Thursday in place of QL, which could not be got ready in time. Messrs. Maxwell and Paddock commenced instruction this week, while Messrs. Williamson and Sellars made good progress with their "A" licence tests.

LIVERPOOL & DISTRICT AERO CLUB

(MAR. 10-16).—Machines in commission: WK, XY XX, Avro "Avians." Instructor: Flt-Lieut. J. B. Allen. Ground engineer: Mr. Howard Pixton. Total flying time: 33 hrs. 15 mins. Pupils, dual: (24), 20 hrs. 35 mins. Pupils, solo: (6), 4 hrs. 20 mins. "A" pilots: (7), 4 hrs. 35 mins. Passenger flights: (7), 2 hrs. 55 mins. Tests: (10), 50 mins.

New pupils: Messrs. A. D. Pate and S. Douglas. Mr. F. Salter ("Sconface") totalled over 5 hrs. flying this week.

Congratulations to Mr. W. G. Eills upon his first solo, which he performed quite successfully on Sunday last. Miss Marjorie Hughes also took the air solo for the first time on Thursday last in a manner so satisfactory that "J B" welcomed her return to earth by administering—chaste salute. Miss Hughes was the first lady to join the club, and is the second to fly solo.

With the instructor and a certain "*ab initio*" pilot, making a habit of collecting kisses from lady members and friends on the aerodrome, this club is becoming too interesting for a staid old bachelor, and the writer is considering resigning.

Mr. Moulsdale is buying a "Moth"—not, as might be expected, a "Bluebird."

Mr. Keniston completed his practical tests for aviator's certificate on Sunday last and is thus the twelfth "*ab initio*" pilot of this club.

Capt. Brown and Mr. Bolsover of A. V. Roe and Co., paid us a visit during the week on the new all-metal "Avian."

MIDLAND AERO CLUB

(MAR. 10-16).—Instructors: Flight-Lieut. T. Rose, D.F.C., and Mr. W. H. Sutcliffe. Engineer: W. J. Halland. Assistant engineer: G. Rees. Aircraft (3): LT, LW, DB. Total flying time, 25 hrs. 27 mins. Dual (11), 6 hrs. 8 mins.; solo (17), 13 hrs. 39 mins.; passengers (8), 4 hrs. 35 mins. Test, 1 hr. 5 mins. Mr. P. B. Hackett commenced instruction.

NORFOLK & NORWICH AERO CLUB

(MAR. 11-16).—Instructor: J. C. Houston, M.C. Ground engineer: A. Kirkby. Machines: Two (Z.W., X.E.). Total flying time, 4 hrs. 40 mins.; dual, 2 hrs. 10 mins.; "A" pilots, 1 hr.; tests, 45 mins.; passengers, 45 mins.

Very little flying has been possible under the weather conditions which have prevailed here during the week.

Thick fogs have been the vogue and poor visibility generally.

Q.X. engine has been sent to A.D.C. for complete overhaul and likewise our Mr. Kirkby. We trust they will both return in splendid condition early next week.

Last week a few members of the management decided we should have a spare engine and they consulted the balance and found it moderate, approached the prophets and found them optimistic, and having sweated all the afternoon on the possibilities of a flag day ordered a spare Cirrus, and drank its health and resolved that it was a very good thing they had done. The engine duly arrived, but as its legs were bent when they should have been straight, or *vice versa*, it was not possible to adapt it to our bus until telephony had been used to put the matter right. Even this was delayed by a great big bully machine, which at the critical moment when the line was just being connected barged straight through the wires, the air certainly looked rather "Blue" for a bit.

We congratulate Mr. T. A. Image this week on passing all his tests successfully.

Four new members have joined up this week.

SCOTTISH FLYING CLUB, LTD.

(MAR. 10-16).—Pilot instructor: R. M. Stirling, A.F.C. Ground engineer, W. A. Calder. Machines in commission: X Moths (G.EBYG—G.EBUX). Dual instruction: 10 hrs. 25 mins.; solo flying, 10 hrs. 20 mins.; passenger flying, 4 hrs. 20 mins.; tests, etc., 2 hrs. 10 mins. Total, 27 hrs. 15 mins. Instruction (with Mr. Stirling): Messrs. D. K. Fairweather, A. McIlwaine, A. C. Jack, A. B. Walter, P. Du Cane, R. Allan, A. Cairns Smith, D. Gardner, and A. Fyfe Burns. Since our last report, on February 16, we have passed through a period of extreme depression in flying activity, including two complete weeks during which we were entirely out of business. This state of affairs, however, we are glad to say, has arisen neither through lack of enthusiasm nor machines but is simply due to a condition of chronic fogginess into which the Clyde valley seems to have fallen since the advent of 1929. Consequently, apart from odd half-hours of dual taken as refreshers by licensed pilots, instructional work, for the time being, virtually is "non est."

However, as a sight of the horizon is confidently expected in July, it is hoped that there will then be great demands on the clubroom facilities which are being extended to cope with them. On and after April 1 it is intended to serve luncheons and teas daily at the aerodrome instead of the present arrangements for week-ends only. These will be available at ordinary city prices, and it is hoped that members and visitors will take every advantage of this departure.

On Friday next (22nd) the last of the season's dances will be held in the "Plaza," Glasgow, when a large attendance is anticipated. Tickets, as usual, are 5s. each, and may be obtained from Mr. H. W. Smith, 101, St. Vincent Street, Glasgow, or from the secretary. Visitors from other clubs or from the Services will be welcomed.

SOUTHERN AERO CLUB

(MAR. 11-17).—Instructors: C. L. Pashley and F. G. Miles. Aircraft: Avro 504 Ks. (Le Rhone).—Flying has taken place every day this week—excepting Monday, which is the regular day on which the club is closed. A number of members are nearing the solo stage, and Messrs. Sale and Barnett have just passed their tests for the "A" licence. These two members are now working for their "B" tickets.

We heard from two of our members abroad this week, namely, Mr. and Mrs. F. P. Raynham, now in Calcutta with the Air Survey Company. Mr. Raynham has been flying a Gipsy-Moth at the opening of the Bengal Flying Club. He spent most week-ends last summer here with his caravan and his Avian.

SUFFOLK & EASTERN COUNTIES AEROPLANE CLUB

(MAR. 10-16).—Instructor: G. E. Lowdell, A.F.M. Ground engineer: E. Mayhew. Aircraft: Two Blackburn "Bluebirds" (S.Z. and U.H.). Flying time, 22 hrs. 35 mins., by Suffolk and Cambridge Clubs, as follows:—

Suffolk Aero Club.—Flying time, 16 hrs. 12 members were given dual instruction (2 hrs. 50 mins.). Three members flew solo under instruction (4 hrs. 45 mins.). Flights were made by ten "A" and "B" licence pilots (7 hrs. 5 mins.). Eight passengers were carried (45 mins.). Seven tests were made (35 mins.).

Dr. Dunn successfully accomplished his height test. Mr. Ward started instruction, and cross-country flights were made by Dr. Sleigh and Mr. Collingwood. We were glad to welcome during the week an "Avian" and a "Moth" from the Norfolk and Norwich Aero Club, and the gold "Moth" of Shell Mex, Ltd., with Capt. Shaw aboard. One machine was out of commission, the engine being down for routine main overhaul.

Cambridge Aero Club.—Flying time, 6 hrs. 35 mins. Three members were given dual (1 hr. 35 mins.). One member flew solo under instruction (25 mins.) Flights were made by two "A" licence members (2 hrs.). Five passengers were carried (2 hrs. 25 mins.). Two tests were made (10 mins.).

New members are joining up in increasing numbers with the prospect of the club being opened permanently after the Easter Display. Next term we anticipate a rush of members now that undergraduates are allowed to join the club with the permission of their parents and tutors. An instructor has been engaged and it is hoped to acquire one or two new aircraft immediately after the display. The type is not definitely settled as members are waiting to see the makers' demonstration flights which it is hoped will be a great feature of the display. So far a "Bluebird" and a "Spartan" are entered for this event. Entries are coming in well for the display and private owners who have not yet received details of the competitive events and entry forms should write to The Secretary, The Aerodrome, Hadleigh, Suffolk.

YORKSHIRE AEROPLANE CLUB

(MAR. 10-16).—Pilot Instructor: Flight-Lieut. H. V. Worrall. Ground engineer: R. Morris. Assistant ground engineer: G. Speight. Machines in commission: 2 (SV and RF). Flying time: 23 hrs. 20 mins. Instruction: 4 hrs. 55 mins. (6); soloists, 1 hr. 55 mins. (2); "A" pilots, 12 hrs. 40 mins. (7); "B" pilots, 3 hrs. 35 mins. (1); passengers, 15 mins. (2).

Mr. Gill was launched on his first solo on Tuesday and put up an excellent performance. Mr. J. Birch transferred from an Associate to a Flying Member. Mr. Severs, of Filey, joined as a Flying Member. Miss Leathart and Mr. Runciman, of the Newcastle Club, paid us a visit in the latter's "Moth" on Friday *en route* to Stag Lane.

FROM THE FLYING SCHOOLS

Henderson Flying School, Croydon Aerodrome

(MAR. 11-17).—Mr. Guinness made an altogether exceptional visit to Cannes. He made landings in fields and gardens never before used as flying grounds. He completed the whole trip himself and brought the machine back in perfect order. Otherwise, the school has been fully occupied. A number of fresh pupils have joined—most of whom prefer to remain anonymous.

A busy season is forecasted. The Avro part of the training soon finds out the weak spots!

North Sea Aerial and General Transport, Ltd., Brough Flying School

(MAR. 10-16).—We have been favoured with fine weather all this week, but, unfortunately, there have been very few pupils here. Consequently our flying time totals only 18 hrs. 55 mins. for the week. F.O.'s Craigen, Hall, Lamb, Lumsden and James received 1 hr. dual instruction on "Kangaroos" and carried out 14 hrs. 25 mins. solo flying.

F.O.'s Craigen, Hall and Lamb left on Monday, Tuesday and Wednesday, respectively; F.O. Hall having completed 2 quarters training and the other two officers, 4 quarters. F.O. Lumsden returned on Friday and completed his remaining quarter's flying.

Messrs. A. G. Loton and J. B. Stockbridge carried out test flights totalling 20 mins. on "Kangaroos" and 40 mins. on "Bluebirds," whilst Mr. H. W. Hall received 2 hrs. 30 mins. dual on the latter machine.

A Bristol Club Competition

THE Bristol and Wessex Aeroplane Club writes as follows:

"An interesting competition is being arranged by us to take place at Filton Aerodrome on Sunday, May 26. It is confined to private owners, and members of clubs on club aircraft, and should prove an enjoyable and instructive afternoon.

Details of the competition are, briefly, as follows:—The pilot having taken off at an arranged time is given marks for (*a*) a loop; (*b*) an evolution of his own choice (more marks will be gained for a simple evolution done well than for a difficult one roughly carried out); (*c*) for a 'close' landing over a tape on the aerodrome; and (*d*) for guessing as nearly as possible the time of his landing as being 10 mins. after his take off (all watches out of the office!).

"The winner of most marks will hold the 'Desprez' Challenge Cup for one year, while there will be other prizes in addition. There will also be a Bombing Contest. Members of the instructional staff of the Bristol Aeroplane Co., Ltd., have kindly agreed to act as judges. All private owners and visitors from other clubs are cordially invited, and are assured of a hearty welcome. There are no entrance fees, but those intending to compete will materially help the organisation if they will advise the secretary as soon as possible as to type of machine, engine and registration.

"Members of the club will be glad to put up for the night a limited number of competitors from a distance if these will give at least a week's notice."

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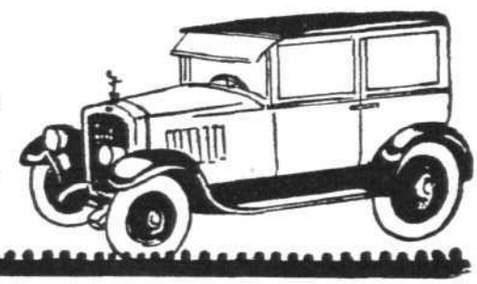

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["FLIGHT" *Photograph.*

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AIRISMS FROM THE FOUR WINDS

Service Flight to Basra

THE R.A.F. Supermarine "Southampton" (Napier) flying-boats, flying to Basra from Plymouth, reached Baghdad on March 13 after a flight of 7½ hrs. from Alexandretta, during which an average speed of 100 m.p.h. was maintained. They made a good landing in the Tigris (which is flooded) at Hinaidi, and were received by a large gathering. Throughout that stage they were in constant wireless communication with Baghdad. The journey to Basra, where they are to be stationed, was completed on March 14. It was on February 28 that the three machines left England, commanded by Wing-Commander T. E. B. Howe.

African Service Flight

HAVING successfully completed the first half of the African flight by arriving at Cape Town on March 7, after leaving Cairo on February 12, the four R.A.F. Fairey III F (Napier "Lion" engines) commenced the return flight. They were reported at Pretoria on March 14, having flown from Durban, Natal. When leaving Gwelo, Southern Rhodesia, on March 18, one of the machines crashed, killing Sergt. Turner instantly, and injuring the pilot, F/O Y. W. Burnett so severely that he died later. The other machines immediately landed, but the four South African machines, co-operating in part of the flight, resumed the next stage, to Khartoum. Just prior to the crash, the R.A.F. machines had given an exhibition of formation flying. They belong to No. 47 Squadron, commanded by Sqdn.-Ldr. C. R. Cox.

By "Bluebird" (Gipsy) to S. Africa

SQDN.-LDR. L. H. SLATTER, who was the senior officer of the R.A.F. Schneider Trophy Team, which won the trophy at Venice in 1927, left England for S. Africa, recently, in an all-metal Blackburn "Bluebird" light 'plane fitted with a D.H. "Gipsy" engine. It is understood that he proposes to fly to Durban, which is his native town.

Airship Fares

THE fares for the coming flight in the *Graf Zeppelin*, from Germany to New York, due to start in May, have been fixed at £400 for the single journey, and £800 for the return journey.

Air Liner for Gold Transport

ONE of the Imperial Airways air liners has been despatched by sea to New Guinea, where it will be used for the transport of gold. The machine is a Handley Page W.9 ("Jupiters").

Medical Aid by Aircraft

CAPT. ROY MAXWELL and Dr. W. S. Paul, recently completed a 1,000-mile flight to Moose Factory, on the Hudson Bay, where Dr. Paul attended a missionary suffering from a broken hip and other injuries. Two other airmen, Capt. May and Mr. Horner, flew 450 miles from Edmonton to Fairview, Northern Alberta, carrying oxygen and apparatus for a farmer who was gravely ill with pneumonia. The apparatus was dropped without the machine being landed, and the airmen were back at Edmonton within seven hours. The patient was reported to be better.

The League and Aviation

THE League of Nations Consultative Committee on Communications and Transit has decided to convene, for next autumn, a special committee to study an effective system of co-operation between civil air services and an international organisation of air navigation. It also discussed the choice of distinctive marks for aeroplanes carrying Ministers to Geneva in time of national crisis, and the special facilities to be given to ensure a safe and uninterrupted crossing of foreign countries during such flights. These points will be further considered by the International Air Navigation Commission in Brussels this week.

Air Links between North and South America

THE United States and South America are to be linked by air mail services this Spring. First, a tri-weekly service will cover only Colombia, Ecuador and Peru, proceeding then via Cuba, Honduras, Nicaragua, Costi Rica, and Panama, but it is expected that the service will be rapidly developed to link up Venezuela, Chile, Argentina and Brazil as well.

General Nobile Resigns

THE Italian Air Ministry announced, on March 13, that General Nobile had offered to resign from duty and resign his rank, which had been accepted. This follows the recent report of the Commission which investigated the *Italia* airship disaster in the Arctic when on the return flight from the North Pole. General Nobile, who was in command, was held to blame.

The French Air Lines

THE Air Union, which enters upon its tenth year of operation this year, is introducing a twice-daily air service between London and Paris on April 8 next with its most luxurious and fastest machines, known as the *Golden Rays*. They are biplanes of metal structure, fitted with twin Renault geared engines giving a total of 1,000 h.p. There are two cabins and each passenger has a separate window, a large Pullman chair and a reading and refreshment table. Besides this service the ordinary services will carry on as usual at reduced rates. Passengers will also be accepted for the freight aeroplanes at very attractive fares.

Women's Race for Records

THE women pilots in America are rapidly competing with each other for the endurance record. As fast as one sets up a new time, another beats it. And as the dimension of time is infinite, it looks as though this race will go on for ever. Perhaps, like Mr. H. G. Wells' hero on his Time Machine, they will fly into the future, and not be able to decelerate and return to the present. On March 17, Miss Louise McPhetridge established a new record of 18 hrs. 6 mins. at San Francisco, which beat that by Miss Bobbie Trout by 1 hr. 1 min.

Forced Landing in Iraq

SQDN.-LDR. E. B. RICE, attached to the R.A.F. at Hinaidi, made a forced landing, 90 miles east of Jask, owing to engine trouble, whilst on a return flight to Iraq. A relief machine flew out to him from Baghdad with a spare engine, but found that the machine was deep in marshy ground, and unable to take-off.

["FLIGHT" *Photograph*

Cowling a four-cylinder, in-line engine. The "Cirrus III" in the Blackburn "Bluebird" is almost totally enclosed, and its drag must be very low. Standing by the machine is Maj. Bumpus, Blackburn's chief engineer.

THE "HELICOGYRE"

The Inventor explains his Machine to the R.Ae.S.

ON March 18, Signor V. Isacco read before the Royal Aeronautical Society a paper dealing with his invention, the "Helicogyre," which is being taken up by the Air Ministry, and of which one specimen is now nearing completion at the Cowes works of S. E. Saunders. With the greater portion of Mr. Isacco's paper we have not the space to deal here. A large section of it dealt with the history of rotating wing flight, and the lecturer gave his views of the reasons for the failure or comparative failure of the various types that have been built from time to time.

The lecturer explained that he had called his machine the "Helicogyre" because the rotation of the wings is caused, not by the air forces on them as in the Cierva "Autogiro," but by propellers driven by engines mounted on the main wings.

In the "Helicogyre," the lecturer stated, sustentation is by two or more wings, individually articulated in all directions to a common hub, turning freely around a practically vertical axle. At the ends of each of these wings are mounted small engines with their airscrews to cause the rotation of the wings in all normal conditions of flight. The petrol tanks for the small wing engines are fitted inside the wings, each engine having its own tanks and feed. The sustaining wings have ailerons forming part of their trailing edges, these ailerons acting as elevators on an aeroplane by changing the incidence of the wings. (Actually they alter also the camber.—ED.)

The lecturer stated that articulation not only in the direction of lift but also in the direction of drag was necessary to prevent the breaking off of the wings at the point where they join the central hub, and where there are changes of load due to periodic variations in the drag force.

The claim was advanced that the efficiency of the "Helicogyre" is greater than that of other rotating wing machines because, owing to the fact that the axis of rotation is vertical, the component perpendicular to the plane of rotation is avoided, and this component, he claimed, was the cause of the low efficiency of the rotating wing with inclined axis. Calculations (not given in detail) showed that in the "Helicogyre" the ratio of lift to drag was not greatly different (about 5 per cent.) from that of the orthodox aeroplane with the same profile and angle of incidence.

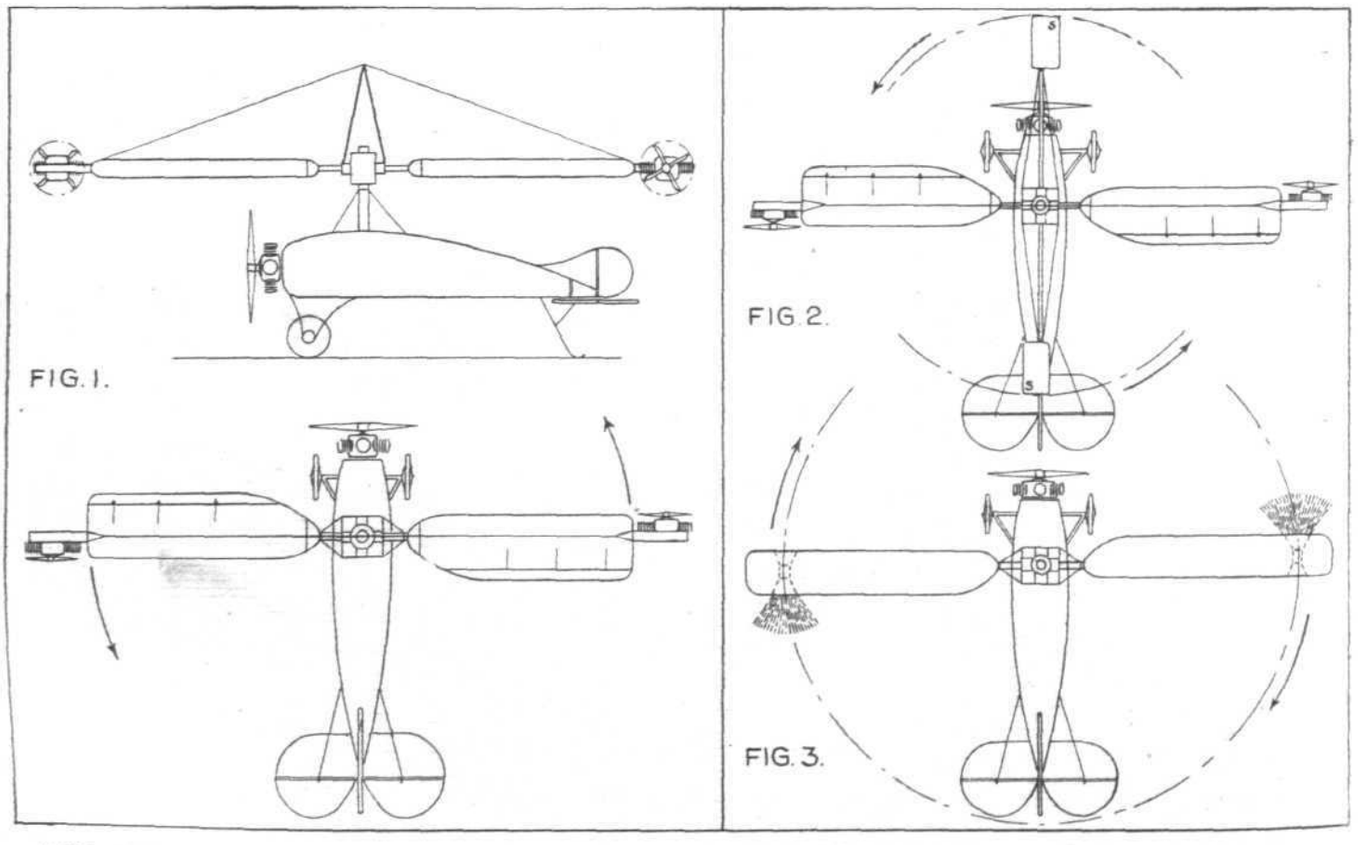
Accepting as one of the essential conditions for a vertically-flying aircraft that it should have (*a*) inherent stability, and (*b*) controlled stability, the lecturer claimed that, thanks to the articulated wings, the "Helicogyre" possesses (*a*), while (*b*) was achieved, when hovering, by small surfaces fitted between the main wings and firmly attached to the machine.

The reason for the placing of the small engines on the wing tips instead of half-way was explained to be due to the better propeller efficiency of the engines where their path was longest, *i.e.*, where the translational speed was greatest. It was, Mr. Isacco said, possible to use wing engines running at 4,000 to 5,000 r.p.m. Also by placing them at the tips, the engines would, by their weight, serve to damp out to some extent the vertical oscillations of the wings caused by variations in pressure (*i.e.*, according to whether their velocity is added to or subtracted from the horizontal velocity.—ED.)

Weight Lifted per Horse-Power

Giving figures of machines of the "Helicogyre" type already built, the lecturer stated that machine No. 1 (French Government) lifted 1,875 lbs. with 100 h.p. of wing engines in spite of the fact that the 50 h.p. Anzani engines were in the middle of the wings, and that therefore the efficiency of their propellers was not more than 60 per cent.

Machine No. 2, with two wings, each carrying a Bristol "Cherub" of 32 h.p. weighed 1,320 lbs., and rose into the air several times using only 50 h.p. The lecturer estimated that with four wings and four engines a weight of 30 lbs./h.p. could easily be lifted, and with improved wing design he thought that an even greater load could easily be lifted.



THE "HELICOGYRE": Fig. 1 shows, diagrammatically, the general arrangement. In 2 are shown the small control surfaces, s, by means of which the machine is controlled when there is no translational speed, i.e., when the machine is hovering. 3 shows Signor Isacco's idea of the jet-propelled "Helicogyre" of the future.

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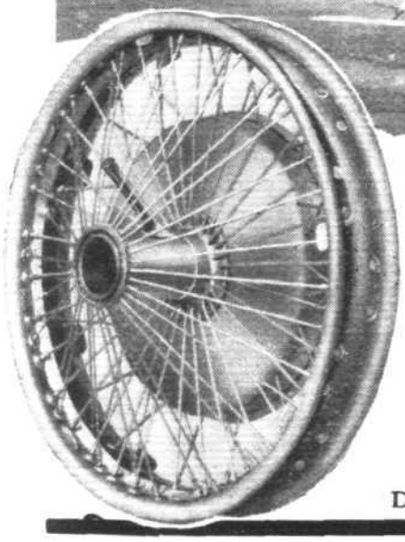

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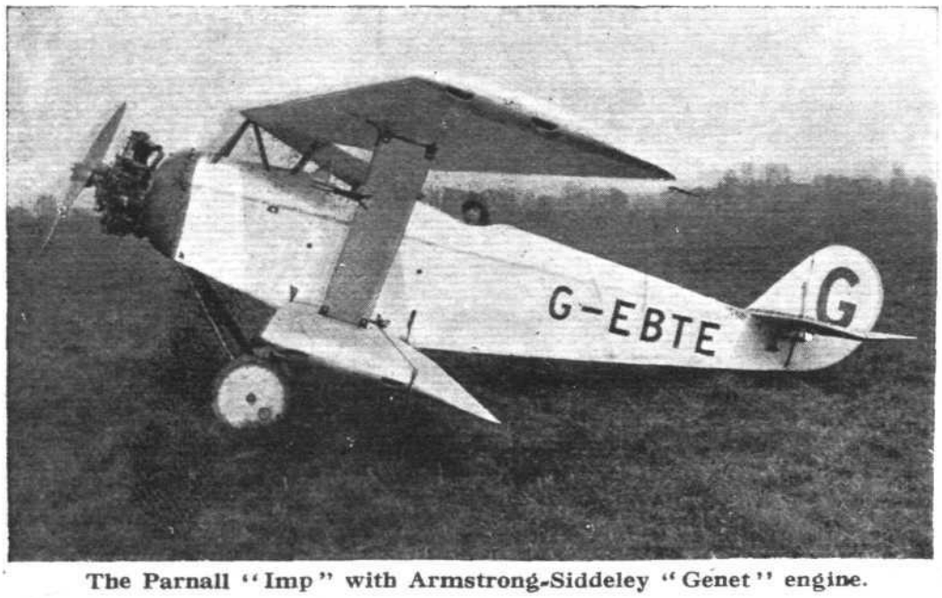

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Excusing himself with the statement that it would take too long to give an exact comparison between aeroplane and "Helicogyre" when in horizontal flight, the lecturer repeated his claim that the difference in aerodynamic efficiency between the aeroplane and his machine was only five to seven per cent.

Safety

In the event of failure of one or more wing engines, the remaining would be sufficient to ensure the rotation of the wing, and should all wing engines fail, which was unlikely, the machine could still be flown as an "Autogiro" by inclining it slightly backwards. Failure of the fuselage engine would not bring the machine down either, as in that case one would tilt the machine slightly forward, and the rotating wings would serve both for propulsion and lift, although at a reduced rate of forward speed.

When descending vertically, with the wing engines stopped, the rate of descent could be checked, when within a few feet of the ground, by the pilot increasing the angle of incidence on the wings with the ailerons. A momentary high lift would be attained, the flywheel action of the wing system being sufficient to maintain rotation for a short time.

The lecturer foresaw as a future development the use of jet propulsion, the jets being situated near the wing tips and in the trailing edge.

The British "Helicogyre"

The machine now being built by Saunders has four wings and four Bristol "Cherubs" fitted to the wing tips. The fuselage engine is an Armstrong-Siddeley "Genet" and the machine is a two-seater.

THE DISCUSSION

The Chairman, COL. THE MASTER OF SEMPILL, complimented Signor Isacco on his English. He expressed the hope that an opportunity might be found later to have another paper by him, and that it would then be possible to show the lantern slides and films which a fracas with the Customs authorities had prevented him from showing that evening. He then called upon the Director of Scientific Research to open the discussion.

MR. WIMPERIS, in reviewing briefly the history and development of rotating wing aircraft, pointed out that it was the invention of the hinged wing which turned the type into a practical machine by giving the stability which the rigid blade rotating wing lacked. He recalled that the Cierva "Autogiro" was the first rotating wing machine to make a cross-country flight of any considerable length. That machine had the advantage of being able to land in a small space. It wanted, however, a fairly large space for taking off, and it was more difficult than one might imagine to design a starter mechanism for giving the rotating wings their initial speed. The ability to get off in a small space was important. He was glad that Isacco had paid a tribute to Cierva.

With reference to the history of rotating wing machines in this country, when Signor Isacco brought his invention to the Air Ministry, his calculations were gone into very thoroughly indeed, and it was quite obvious that in Signor Isacco they had an engineer of outstanding ability, who had gone fully into the details of his invention. That was in itself something rather unusual, as many inventors put forward all sorts of claims, but had not the technical knowledge to go into mathematical calculations. He noticed that Signor Isacco had not referred to the Brennan helicopter, probably because as far as he was aware no information concerning it had ever been published. The Brennan helicopter was built, Mr. Wimperis said, by a number of people, and finally finished up at Farnborough. It was not Farnborough's fault that the machine was not successful. After Brennan the Air Ministry turned to Cierva, and now to Isacco. Each of the three marked a stage in the development of the rotating wing aircraft. The "Autogiro" had the stability and the ability to land in a small space. It was hoped that the "Helicogyre" would, in addition, have the ability to get off in a small space. Whether the take-off and alighting would prove as easy as expected still remained to be seen. Mr. Wimperis recalled that Cierva had learned to pilot his own machine, and he was glad to say that Isacco also intended to fly the "Helicogyre." He wanted particularly to emphasise the part of the invention which related to the ability to increase the angle of incidence and thus make use of the kinetic energy stored in the rotating wing system. That was important. The gentleman on his left (Mr. Handley Page) had, by introducing the automatic slot, reduced considerably what had to be achieved by the rotating wing machine, as the stall and spin had lost much of their risk. It was, however, the view of the Air Council that the possibilities of the rotating wing aircraft should be explored so that it should not be found later that we had left its problems behind us.

MR. HOBSON stated quite definitely that vertical flight was not possible with the engines and materials available to-day, and thought the problem of vertical flight was better left until later, when, perhaps, better materials and engines would make vertical flight possible.

Other speakers raised various points in connection with the lecture. For instance, it was pointed out that the small airscrews of the wing engines, owing to the varying conditions under which they were working, would be subjected to varying pitch loads and might set up periodic vibrations. In the case of the "Autogiro" it had been found that if the pitch of a blade was suddenly altered (as it sometimes was accidentally), the blade would rise quite fast and suddenly, and one speaker desired to know what would happen to Isacco's aileron-controlled blades. He also was doubtful about the petrol system of the wing engines, which might be subjected to centrifugal forces up to 8 g.

Lifting up to 30 lb./h.p. on a rotating wing was criticised by one speaker, who pointed out that on a tractor airscrew much smaller loads were carried. It was possible, theoretically, to get up to perhaps 10 or even 15 lbs./h.p., mainly by increasing the diameter, but there was still a long way to go before one reached 30 lb./h.p.

One speaker (MR. MANNING) pointed out that the one thing aircraft had to sell was speed. It had nothing else. A machine which did not give a fairly high speed was, therefore, not of much practical use. The lecturer had referred to lifting a certain weight with two Bristol "Cherubs." In the new machine which had just been finished, the lecturer had stated that there would be four "Cherubs" and one "Genet." A normal light aeroplane would be able to fly, with the same amount of power, at something like 140 m.p.h. He would like to know what top speed Signor Isacco expected to get from the "Helicogyre."

MR. HANDLEY PAGE confessed that he had listened intently to the lecture but still remained unpersuaded. When speaking of rotating wing machines, it was customary to refer to the advantages which one got from them. One wanted to see what one got and had to pay for the advantages offered, and in the case of rotating wing aircraft the advantage claimed was always the ability to rise and descend vertically. He was not at all sure this was an advantage. The "Autogiro" was acclaimed because it could land in a small space, and the "Helicogyre" because it was expected to get out of a small space. If one took a normal aircraft type with wide speed range and low landing speed, it could get out of a reasonable size field. When clear of the ground it could gradually go around in circles (this should appeal to the Air Ministry) until sufficient height had been attained, and could then set off on its journey. Similarly, in landing, it could come down in fairly tight spirals and flatten out at the last moment.

He thought that aerodynamically the rotating wing machine must be inferior because, as Prof. Bairstow had once said, its wings, instead of going i a straight line from point to point, travelled around in circles. (This reference is to some remarks made by Prof. Bairstow on the occasion when Cierva first described his "Autogiro" to the Royal Aeronautical Society. Prof. Bairstow then said that he had not yet had an opportunity to go thoroughly into the subject, but as drag multiplied by distance represented the work done, it would seem that the rotating wings, owing to having to cover a much greater distance, must absorb more power from one point to another than the aeroplane wing.—ED.) In the "Helicogyre" the wings had so many varying conditions to work under that it seemed inevitable that they must introduce a certain amount of inefficiency.

With reference to the engines on the wings, he thought added risk might be introduced. Even the best of engines occasionally shed bits such as sparking plugs or even cylinders, and when the engines were travelling around at high speed, as in the "Helicogyre," the consequences might be more serious. In the old days of flying, the rotary engines had to be extremely carefully balanced, and it would seem that here all the old difficulties were coming up again. Finally, Mr. Handley Page admitted that, although he had criticised everything he could think of, he did feel that, just as in the old days there were those who said the aeroplane was impossible, so now he felt that he did not believe in the rotating wing machine, but he was not entirely certain that he was correct.

THE AIR ESTIMATES

Debate on Report Stage in the House of Commons

THE Debate on the Air Estimates, Report Stage, was continued in the House of Commons on March 12. On the Vote prov ding for a total establishment of 32,000, all ranks.—

Lieut.-Com. Kenworthy (Hull Central.—Lab.) raised the question of the system of recruiting cadets and apprentices. He pointed out that the Air Service came into existence without the traditions of the Navy or the Army, and could therefore build up its own traditions and *esprit de corps*. Yet, he thought the Air Force had been deliberately creating artificial class distinctions and class barriers. There appeared to be a tendency to give the key positions in the Air Force to former Army officers, and he would like an assurance that the great services rendered by Naval officers in the earliest stages of the Air Force were not being forgotten. He also complained that it was practically impossible for a boy, however able and talented, to enter Cranwell unless his parents had means. Was any attempt being made to democratise the Air Force ?

Sir S. Hoare, Secretary of State for Air, said that he agreed with the object of Commander Kenworthy with a single reservation. He (Sir S. Hoare) rather wanted to democratise the Air Force and not to aristocratise it, and he would much prefer to keep it clear of these political phrases altogether. In connection with promotion, the last thing they wished to do was to draw a distinction between ex-Army and ex-Navy officers or officers who had been in neither Service. He hoped that they were succeeding in getting the right men at the top, whatever their past careers might have been. It might be that in the senior posts there were more ex-Army officers than ex-Naval officers, but that was purely a matter of chance, and if it was the case today the reverse might be the case tomorrow. As to the entry of boys into Cranwell, the Air Force were giving a remarkably wide opening to young men of moderate means.

Mr. L'Estrange Malone (Northampton.—Lab.) said he was not satisfied on the point concerning the proportions of naval and military officers in administrative posts at the Air Ministry and throughout the Air Forc . As aviation was primarily a naval science he suggested that the Air Force had a great deal to gain by seeing that in important positions in the Air Ministry, Naval officers were not pushed out.

Question put and agreed to. On the third resolution—Vote of £1,700,000 for works, building, etc.—

Lieut.-Com. Kenworthy asked for details of the sum of £576,000 for the cost of the air station at Singapore. He would not criticise the establishment of this air station if he thought that it would mean a saving in naval expenditure. But if this was simply an air station for the defence of the new dockyard at Singapore this sum seemed extraordinarily large. He could see no trace anywhere in the Air Estimates of any change of policy since the signing of the Kellogg Pact. He also called attention to the heavy expenditure this year on Cranwell College—£25,000 for the college and £26,000 for the electrical and wireless school. Would it not have been possible to obtain one of the many empty country houses and adapt it for the needs of this college without going to the expense of building a new institution ?

Col. Woodcock (Liverpool, Everton.—Con.) said, referring to the Cranwell College, if we were to have a college, we should have a proper college, and it would be more economical in the long run to build exactly what was wanted and build it properly—not adapt an existing building as suggested.

Mr. Benn (Aberdeen, N.—Lab.) asked for information regarding the expenditure on the air stations in Egypt and the Middle East.

Mr. Kelly (Rochdale.—Lab.) also asked for information on the new Home stations.

Sir Samuel Hoare, replying, said the Singapore station would serve a double purpose. It would be part of the naval base capable of taking the air side in any operations that might take place. Even if there were no naval base at Singapore it would be necessary to make this provision in connection with our air communications. The expenditure at Cranwell was necessitated by buildings to replace the huts that were beginning to tumble down and which were not economical to maintain. The total expenditure would be spread over a number of years, £25,000 being expended this year. The new station in East Anglia would house several squadrons of the increaed home defence force, while the aircraft park at Peterborough would be used as a depot. The new aerodrome in the West of England would be completed at the end of the year and would accommodate one auxiliary squadron and one special reserve squadron. A great centre like Bristol, he thought, would welcome an opportunity of having a teritorial squadron attached to the locality.

Resolution agreed to. On the fourth resolution, Vote for £6,585,000 for technical and warlike stores, etc.—

Mr. Malone asked if, when the Air Minister consulted the Treasury and the Cabinet concerning the Estimates, there was any point in these negotiations at which the Chancellor of the Exchequer or the Prime Minister brought together the heads of the three fighting departments to ask to consider if the Army and Navy Estimates were reduced and the Air Estimates increased whether it would provide adequate defence for the country. He inquired whether the Minister, as the largest consumer of light petrol in the country, took steps to get in touch with the Cabinet with a view to keeping down the price of petrol when negotiations were going on for its increase. The Government, through their directors on the Anglo-Persian company, had material holdings in the petrol supplies of the world, and they should see that they did not have to pay the extra price in order to satisfy certain private interests that had formed a monopoly combine. On the question of airships he asked if the Secretary of State for Air could tell them something about the development of the airship.

Mr. Wells (Bedford.—Con.) congratulated the Air Minister on the splendid progress that had been made in regard to heavier-than-air machines, but at the same time he thought it would be a pity to limit our interest in the Air Force in that direction only, and welcomed the statement with regard to the airships R.100 and R.101, which he understood would fly this Spring. At present we were leading the world in airship construction, but he wished that there were more enthusiasm in this country and throughout the Empire for airship development.

Mr. Gillett (Finsbury.—Lab.) criticised the action of the Air Ministry regarding putting out to contract the work in connection with the construction of the framework of airship R.101. He also referred to the question of misappropriation of petrol.

Sir Samuel Hoare, in reply, said he was glad more than one Member had raised the question of airships. The programme of airship construction had been in operation over a number of years. It had been a very great experiment, perhaps a greater one than they contemplated four or five years ago. They were not content to base the experiment simply on war experience, or on the lessons that might be drawn from the construction of Zeppelins in Germany. They went back to bedrock, and started the experiment almost *ab initio*, relying in particular on scientific investigation and on a long and protracted series of experiments. They could perfectly well have built two airships—indeed, they could have built 20 airships—in half the time if they had attempted simply to repeat the construction of the old wartime Zeppelins ; but they took a different course, and as a result had occupied a long time with their experiments and had spent a considerable sum of money. He believed it would be shown that that time and money had been by no means wasted, and that we were to-day, both in the design of the two airships and in our general knowledge of the operation of airships, far ahead of any other country in the world. No scientific, technical, or operational effort had been spared which would inure to its success. The two airships were within sight of completion, and it was interesting to note that although they had been designed and constructed under somewhat different conditions they had taken about the same time to complete. It looked as if both airships would be finished some time in the spring or early summer, and that they would each cost about the same amount of money. The cost in both cases would be substantially more than the original estimate, but in a great experiment of this kind was almost inevitable. The next stage of the programme was that as soon as they had finished their shed trials, which should take place during the next few weeks, assuming that the trials were satisfactory, a number of trial flights would be held within reach of Great Britain. If those flights were successful the Cardington airship—R.101—would be run, first of all to Egypt, and then to India, where a mooring mast and shed were already in existence at Karachi.

Supposing these trials to India were successful, the next step would be—and he hoped that it might be taken within the next twelve months—to run R.101 across the Atlantic to Montreal. The Dominion Government, who had most sympathetically co-operated in this experiment for some time past, had constructed a mooring mast near Montreal. In the meantime other experimental flights would be carried out with R.100, and there was every reason to suppose that within the next twelve months these airships would be flying regularly, and, he hoped, successfully, and would be beginning to make the Imperial flights to which they all attached so much importance. The further programme would, of course, depend upon the results of this experimental period, which, if they were successful, would mark a new era in the development of Imperial communications. He was fully alive to the desirability of keeping, as far as possible, the key *personnel* for future development, and he hoped to make arrangements for some of the expert staff to be retained. He would be glad to make arrangements for any Member to go to Cardington and see the R.101.

Referring to other points raised, Sir Samuel said, as regards the standard of the air mechanics, he thought so far from it having deteriorated, it had actually risen. On the question of the contract for R.101 with Messrs. Boulton and Paul, there were several exceptional conditions connected with it. It was for a new kind of work, work of a very novel description, stainless steel of various kinds, new kinds of light girders that had never been constructed before. Although it was their desire always to place orders of that kind out to tender, that particular work was not susceptible to tender. He had been informed that the firm in question were really the only firm that could successfully undertake the work. We gave the work to the firm on condition that we paid them for the labour and the material, and we had a definite limit from the very start upon their " overheads " and their " parts," and he was told that we made so good a bargain from the point of view of the Air Ministry that it appeared as if the firm would be substantially down on the transaction. He thought that if we had tried to do the work by direct labour, or if we had put it out to tender, the result would have been not less but greater expenditure, because the work was of such an exceptional kind that there was no data upon which we could base tenders or estimates for direct labour.

Lieut.-Com. Kenworthy referred to the past achievements of airships, and hoped the present experiment would turn out well. He also dealt with the estimate for petrol, which he thought was very high, and asked if the Air Ministry paid petrol tax to the Treasury.—Sir Samuel Hoare replied in the affirmative to the latter point.

Mr. Beckett (Gateshead.—Lab.) said he wished to draw the Air Minister's attention to a serious matter on which he had been giveninformation—which was that petrol at the Henlow aerodrome had been used for other purposes than Service flying.

Sir P. Sassoon, Under-Secretary of State for Air, replying to points raised in the debate, said that with the advent of the heavy-oil engine it was not at all certain that in the future, hydrogen, which was a lighter gas, would not be more suitable for airships than helium, but they were doing everything they could to get in touch with the United States and Canada on the question of helium supplies. In regard to the rise in the price of petrol, he could not say whether there were any alternative means of supply. They might be able to meet the extra cost out of savings, but whatever happened, it certainly did not mean that less flights would be taken. As regards the point raised by the hon. Member for Gateshead, the charges were quite novel to him. He had heard nothing about them at all, and would be pleased if the hon. Member would give particulars.

The Vote was agreed to. On the Vote of £415,000 for Civil Aviation—

Col. Applin (Enfield.—Con.) criticised the National Flying Services scheme. At present one of the principal means of training civil pilots was provided by the 13 light aeroplane clubs. Their subsidy came to an end in August of next year, and in place of these clubs and their subsidy we were to get a new company which was to get a monopoly—a form of subsidy—from the Minister. It was not right, he thought, that Government money should be given as a subsidy exclusively to one company, and that those clubs should be compelled to join that company or to lose their subsidy. The right hon. gentleman would have done very much better if he had allowed the local authorities, with the aid of a subsidy, to provide the necessary flying grounds, in connection with which facilities for sport could be provided. The public had subscribed over £30,000 towards the 13 flying clubs. Was that money to be lost, and were those clubs to die because a monopoly was given to a single company ? He appealed to the Secretary for Air to recognise the necessity for keeping these flying clubs in existence.

Mr. Viant (Willesden, W.—Lab.) pointed out that the subsidies paid by the Government to Imperial Airways amounted to more than twice the sum that had been subscribed by the shareholders. Instead of putting public money into the pockets of private speculators, he thought we should have a nationalised service.

Col. Woodcock (Liverpool, Everton.—Con.) hoped that the Minister would make some definite statement about the light aeroplane clubs and their relations to National Flying Services. He hoped that these clubs would not be entirely " snuffed out " by the formation of this new company. Those clubs had been pioneers in the creation of an air sense among the public and in teaching sportsmen to fly. Many thousands of pounds had been spent on their provision and equipment. The clubs were anxious to know if, at the end of the arrangement with the Minister, their existence was to cease.

Sir S. Hoare said that at present there were 13 light aeroplane clubs in different districts receiving the subsidy. There were also a number of non-subsidised clubs. Those 13 clubs were doing the most excellent work. There was no branch of the activities connected with the Air Ministry during the las :

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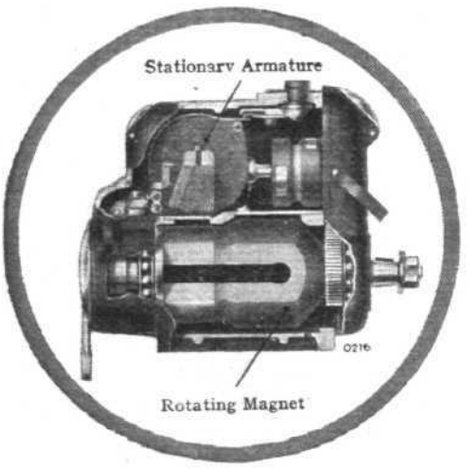

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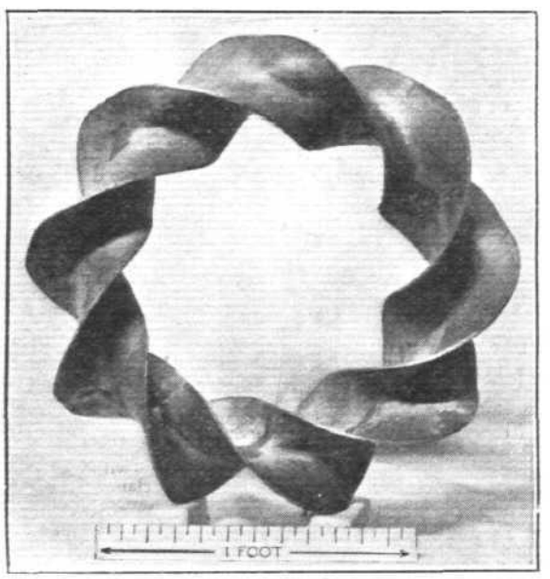

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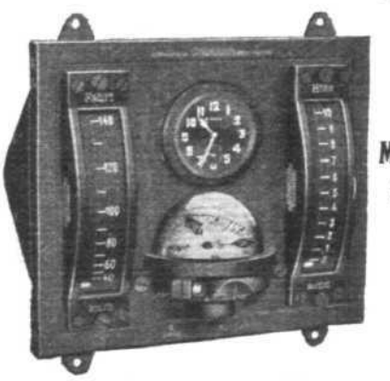

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five or six years that had been more altogether satisfactory than the development of the light aeroplane clubs. It was a new idea : no other country had started it. It succeeded here, and it was now being copied in many other parts of the world.

But the deficiency of the present arrangement was that it only provided flying facilities for a certain limited number of districts and a certain limited number of pilots. The 13 subsidised clubs produced about 350 trained pilots. Any hon. member who wished to increase the air sense of the country would agree that they ought to extend those facilities for pilots. Then Capt. Guest came forward with a proposal not to compete with the light aeroplane clubs in their own districts but to provide flying facilities in other districts which did not at present possess them at a much smaller sum than the sum he was now paying to the subsidised light aeroplane clubs. If the scheme was successful, it would provide flying facilities on a much larger scale than the existing light aeroplane clubs could ever hope to offer. From the point of view of increasing flying opportunities in the country, obviously a scheme of that kind presented many attractions. He, therefore, agreed, subject to the approval of the House, to make to National Flying Services, Limited, a small annual payment, based entirely on results. First of all, it was based on the number of pilots provided : £10 for each pilot, as compared with the £40 or £50 now paid for a pilot in the existing clubs. Also, it was hoped that it would provide new landing grounds and aerodromes. It was of immense importance from the point of view of flying and also from the point of view of air defence. One of their great difficulties in air manœuvres had been the deficiency in landing grounds and aerodromes. If, by means of this new venture, they could obtain 100 new landing grounds and aerodromes, it would be of incalculable advantage to the Air Force.

The last thing he wished to see was any harm done to the existing light aeroplane clubs. He believed the scheme would do no harm to them at all. It was not going into districts where they were already providing flying services. It raised no question of altering anything in the agreements which he had made with the existing clubs. Those agreements ran for some considerable time further. They were based on the principle that the clubs required a subsidy for three years, and at the end of that time the clubs would be self-supporting—he hoped they would. He would like to see the end of all subsidies, but, supposing it was found in actual experience that the clubs were not self-supporting between now and the time the agreements had run out, quite obviously they would have to meet together to reconsider the position. The Ministry would be prepared to discuss the matter again if things went badly with the clubs during the next 12 or 18 months. He regretted the necessity for having to pay subsidies in connection with civil aviation, and hoped that they might soon be discontinued. Many of the questions on details that had been addressed to him regarding the Indian route must be answered by the Imperial Airways Company, as this would be at commercial rather than a Government service. Every possible arrangement would be made for the comfort of passengers travelling by this service, the inauguration of which would mark a new era in Anglo-Indian communications.

The resolution was agreed to.

THE NAVY ESTIMATES

Mr. Bridgeman, First Lord of the Admiralty, introducing the Navy Estimates in the House on March 14, made the following references to aircraft and aviation. He said he had reduced the maintenance charges under almost every head, but there were three under which they had not been reduced. "One," said Mr. Bridgeman, "is the Fleet Air Arm. There is an addition there of £220,000, and practically all of that goes to providing an instalment of two more flights to the aircraft carrier *Glorious*, which will be commissioned this year, but will not have a full equipment of aircraft until 1930. The Fleet Air Arm is manned up to the authorised proportion of 70 per cent., that is to say, 92 naval officers are now employed in it, and 19 have been trained and reverted to periods of general naval service. The actual service has risen from 105 aircraft in 1924 to 135 in 1928, and the number at the end of the year 1929 should be 153. This is a very modest force, but great progress has been ma e in these years in zeal and efficiency, and I think we may congratulate all the personnel concerned. There has been a delay in fitting catapults to ships other than aircraft carriers owing to the necessity of experiments being fully tried out. Only two, so far, have been installed, but we are hoping to make provision for more in the near future."

Referring to the possibility of another war, he said : "There is no guarantee that there would be any neutrals if the world went to war again. International agreements may secure a good deal, but they cannot give absolute security for our trade. Let us be logical. If hon. members are prepared to trust our seaborne trade to international action, are they prepared to do the same with regard to our Air Force ? If they are prepared to scrap our trade cruisers, are they prepared to scrap our Air Force ? It has been suggested that we might have international agreements which would prevent open, undefended towns from being bombed. Everybody in this country would agree that such a suggestion would be excellent if it would work, but it has been said that such an agreement is impossible because the occupants of the towns might be making munitions, boots and shoes, etc., in order to help to prosecute the war. If hon. members are not prepared to take the risk by reducing the Air Force, why should they be prepared to take the risk in regard to our seaborne trade by reducing the number of our cruisers ? "

During the course of the debate which followed, **Com. Bellairs** said it was not true that "a cheap little aeroplane" could blow up a battleship costing six to seven millions, or that a bomb dropped within 200 yards of a battleship would sink it. It was not true that an aeroplane was cheap, allowing for the aircraft carrier behind. No bomber, he said, with a heavy bomb could take off from an aircraft carrier. He then referred to the aerial bombing experiments of the Americans and suggested that these were not conclusive.

Mr. Malone said he did not agree with the hon. member for Maidstone (Com. Bellairs) on the question of aeroplane *v.* battleship. The torpedo-carrying aeroplane was the most vital weapon of all.

Lieut.-Col. Moore-Brabazon (Chatham—Con.) said they would never be able to make far-reaching economies until there was some machinery for deciding which Department was best fitted for a particular job. They could never expect, for instance, the First Lord of the Admiralty to declare that the air service could best defend our ports. If Mr. Bridgeman did venture on such a statement he would very soon be made to walk the plank.

Sir Oswald Mosley (Smithwick—Lab.) said the hon. member for Maidstone (Com. Bellairs) seemed to think it was only possible for aeroplanes to operate from an aircraft carrier, but we had statements from high authorities that no ship would be safe within a 500 miles radius of a hostile shore during the next war. Com. Bellairs also thought an aeroplane could not come below 8,000 ft. if subjected to hostile fire. He (Sir Oswald) every day for many months had to reconnaissance under hostile fire at well under 6,000 ft. From the outset of the last war the air sprang continual surprises on the old-fashioned military mind, and he had every confidence that in the next war the air would spring similar surprises on the old-fashioned naval mind.

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IN PARLIAMENT

Cost of R.A.F. Petrol

SIR S. HOARE, on March 7, in reply to Sir N. Grattan-Doyle, said the extra cost as the result of the recent increase in price, based on average consumption, is estimated at £640 per week.

Registered Civil Aircraft

SIR. S. HOARE, in reply to Mr. Wellock, said the number of civil aircraft registered in Great Britain and Northern Ireland is 453, of which 361 have been granted certificates of airworthiness and may be regarded as in use or available for use ; the remaining 92 are aircraft in various states of construction or under examination for certificates of airworthiness.

United States Air Expenditure

SIR SAMUEL HOARE, on March 13, in reply to Commander Bellairs, said that questions regarding expenditure on the United States Navy and Army should be put to the First Lord and the Secretary for War. As regards air expenditure, there is no separate air budget in the United States, but, including what is in that country officially termed "indirect" expenditure, *i.e.*, expenditure which is not shown under separate air headings but embedded in the main Naval and Military votes, the figures may be taken, when converted into sterling at current rates of exchange, to be approximately as under : 1928-29, £22,000,000 ; 1929-30, £24,500,000.

I should add that there were certain supplementary estimates for air expenditure in the year 1928-29 which are included in the above total and it is possible, if not probable, that there will be similar supplementaries in the course of 1929-30 which will augment the provisional figure given above for this latter year. Civil aviation figures are not included.

Aircraft International Comparison

MR. WELLOCK asked the Secretary of State for Air the approximate number of commercial, military, and naval aircraft, respectively, possessed by the United States of America, Germany, France, Italy, Russia, Spain, Czechoslovakia, Japan, and Great Britain, respectively ?

As regards commercial aircraft, I assume that it is the figures for registered civil aircraft, in contradistinction to Service aircraft, which the hon. Member requires ; these are according to the latest information available, approximately as follow :—

United States, 5,200 ; Germany, 750 ; France, 540 ; Italy, 370 ; Russia, 700 ; Spain, 22 ; Czechoslovakia, not known ; Japan, 65 ; Great Britain, 453.

I should add that the figure for Russia must be regarded as provisional, since I have no official information in respect of that country. As regards naval and military aircraft, so far as I am aware it is not the practice of any of the countries mentioned to publish details of the stocks which they hold of such aircraft, but such official information as is available on the subject will be found in the Armaments Year Book published by the League of Nations.

Civil Aviation, Sheffield

MR. LOUIS SMITH asked the Secretary of State for Air whether, seeing that Sheffield, after an appeal by the director of civil aviation for co-operation in regard to aviation, has received a request from the Sheffield Flying Club for a flying club subsidy, he will say what answer has been returned ; and what encouragement he is showing to those clubs which, like Sheffield, are endeavouring to encourage the promotion of civil aviation ?

Sir S. Hoare : As regards the first part of the question, the reply, addressed by the Air Ministry to an application received from the Sheffield Flying Club for a subsidy similar to that granted to other clubs, was that such a grant could not be made, the number of clubs which could be granted assistance being strictly limited and any addition to this number being now impossible. As regards the last part, clubs which become affiliated to National Flying Services, Limited, will benefit from the support extended to that company, and I understand that the Sheffield Flying Club is already in touch with the company with a view to taking advantage of the benefits which can be secured in this way.

Foreign Air Estimates

SIR S. HOARE, in reply to Mr. Wellock, said the total French and Italian Air Votes for 1929 are 1,821,000,000 francs (exclusive, however, of service pensions) and 700,000,000 lire, respectively. Owing to the classification of the Votes in these countries, it is not possible accurately to separate these totals into expenditure on civil, naval and military aviation. The corresponding total in the case of the United States is approximately 145,000,000 dollars. The other countries referred to in the question do not maintain separate air services, and in their case expenditure for air purposes is to a considerable extent borne upon their main Army and Navy Votes and cannot be segregated from general military and naval expenditure.

R.A.F. Apprentices and Discharge Purchase

SIR S. HOARE, in reply to Mr. Broad, said R.A.F. apprentices, in common with other recruits, have the right to claim their discharge within three months of their enlistment on payment of £20. If they do not claim discharge within that period, they can only obtain it on very strong compassionate grounds, and the same rule applies to ex-apprentices who have not completed two years' service after leaving the training school. Ex-apprentices who have completed their two years since leaving school may be permitted, if it is possible without detriment to the service, to purchase their discharge by paying £100, reducible in certain cases at the discretion of the Air Council. These rules are necessary owing to the heavy expense of training apprentices.

Subsidised Air Service, Karachi-Delhi

EARL WINTERTON, on March 18, in reply to Mr. Snell, said the Government of India had called for tenders for the operation of a subsidised air service from Karachi to Delhi, with an eventual extension to Calcutta. The terms and conditions were very detailed, and a copy of the memoranda issued to tenderers by the Government of India would be sent to Mr. Snell.

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A Reunion, R.A.F. Depot, Middle East

IT is hoped to organise a re-union dinner for all ranks who served at R.A.F. Depot, Middle East, Aboukir. Will all those interested in this matter please communicate with Charles Short (Ex-341902 Cpl. "B" Sqdr.), 9, Keeley Road, West Croydon.

RUGBY FOOTBALL

ROYAL AIR FORCE *v.* ROYAL NAVY

Played at Twickenham on Saturday, March 16. Won by the Royal Navy by 8 Points to 3

BUT for a slight east wind, from which spectators in the principal stand were effectively sheltered, the prevailing conditions for the tenth annual encounter between the two services were more reminiscent of cricket at Lords in early May than of a contest under a football code that one associates with the climatic severities of the depth of winter. Some time before the start of the game, the rays of a bright sun broke through the thin veil of cloud which partially obscured an otherwise unbroken blue sky, and cast their radiance over the turf of the playing-field, whose spring like greenness stood out in vivid contrast against the masses of straw that were piled up beyond the touch-lines. The one incongruous note was the paucity of spectators that had been attracted to the ground for this important fixture; the small groups, dotted here and there in the vast enclosures, barely totalling 3,000 persons in all.

But lack of numbers was more than compensated for by the degree of enthusiasm that was manifested throughout the game by the majority of the onlookers, and the partisanship demonstrated by those present revealed the Air Force Fifteen in the light of pronounced favourites with the crowd. The spark of keenness on the part of the airmen's supporters was soon fanned into a flame by the way in which the Air Force representatives took charge of the game in its opening stages. From the outset, it was obvious that the Navy pack would have to put in every ounce of energy that they could muster, to prevent their opponents from over-running them in the scrums. In the matter of pure shoving, the sailors were perhaps the heavier set, but smart wheeling and heeling more than neutralised the effects of the application of sheer weight; with the result that, in at least four cases out of every five, the Air Force halves were able to get possession of the ball, and, with Squadron-Leader Russell, nearly always the master of his opposite scrum half, the Air Force back division cannot be said to have been starved in the matter of opportunities. Russell combined well with Flight-Lieutenant Odbert, who fed his three-quarters with judgment and rapidity, frequently starting a forward movement on his own, and then passing out to the backs after drawing the opposition. Time after time, he set the three-quarter line in motion in this way, and time after time a smart bout of passing threatened danger to the Navy defenders. But every movement broke down through apparent overkeenness producing a fumble or a knock-on at the psychological moment. Pilot-Officer Cotton, in particular, though otherwise playing a sound attacking and defensive game, repeatedly clung to the ball and made a diversion towards the centre, when a timely pass to Flight-Officer Harvey, on the wing, would have opened the game up more promisingly for his side. With only Stephenson barring the way on many occasions, the Air Force left refrained from developing an attack on that wing, which, despite the merits of the Irish international, might well have been fruitful in results. It is to be hoped that Cotton and Harvey will display a better understanding between themselves, and show more enterprise in this direction, when the Air Force fifteen line up against the Army this week (Mar. 23).

What has been said concerning Cotton's tendency—to hang on too long to the ball, and to make for the centre when opening up the game on the wing offered better opportunities for scoring—equally applies to the tactics employed by the Navy centres. Indeed, they were probably more at fault in this respect than their opponents, and, for three parts of the game Stephenson and Wood, on the wings, were little more than passengers, as far as attack was concerned. Of the two back divisions, the Air Force "threes" displayed greater cohesion than those on the winning side, and the two tries scored by the Navy were rather the results of opportunism than of any cleverly-planned concerted movement, Wood scoring after a lucky breakaway following some scrambling play near the half-way line, whilst the try credited to Sub-Lieut. St. Clair Ford was led up to by Lieut. Garrett intercepting a pass between two of the Air Force backs, and racing down towards the line with St. Clair Ford at his heels and only Flight-Officer Llewellyn to pass.

Garrett was undoubtedly the outstanding player among the Navy backs. His kicking into touch was masterly, and frequently relieved the pressure when his side seemed on the point of being overwhelmed. His work, both in defence and attack, was sound throughout the game, and the openings he made for his three-quarters were especially praiseworthy from the fact that he received very little assistance from his partner at scrum-half, who himself was crabbed by the inability of the forwards in front of him to get the ball out of the scrum more often than not.

The tackling on both sides was very keen, and spoiling tactics were, perhaps, the special feature of a hard game, which can correctly be described as a battle of forwards. For the most part, the Air Force pack demonstrated a consistent superiority over their rivals, although for a brief spell, after change of ends, the Navy forwards displayed better form. In the loose, this ascendancy on the part of the Air Force forwards was generally noticeable, but was not so pronounced as in the scrums. Flying Officer G. R. Beamish and Flight-Lieut. Chick were the most conspicuous men in the pack; but of the Air Force team as a whole, Odbert and Russell stood out from the rest. Llewellyn's tackling and kicking into touch were marked by soundness and good judgment, and he never missed a chance of opening up the game on his own account, when the position favoured the adoption of such a policy.

To sum up, a score of 8 points to 3 in their favour rather flatters the Navy side on the run of the play, for the Air Force men had quite two-thirds of the game, which, particularly in the first half, was carried on for long periods in the Navy's territory.

Details of the Play

Except for the eleventh-hour substitution of Flying Officer Tattersall for Pilot Officer H. A. Constantine in the Air Force pack, both teams turned out as originally selected for this first game of the present season's Inter-Services Tournament.

Following the kick-off, the opening exchanges were fairly even. In the tight, the superior heeling of the Air Force forwards enabled them to get the ball away to their halves and backs four times out of every five. But mid-field play was the order during the first 15 minutes of the game, owing to the inability of the Air Force backs to make the best of the openings provided for them by those in front. Nevertheless, what attacking there was was initiated by the airmen, and on three occasions it required smart kicking into touch on the part of Lieut. Garrett, the Navy's stand-off half, to relieve the pressure. Following the third of these kicks, play was taken into the Air Force 25, and Gosling, the Navy's full-back, attempted to drop a goal—the ball, however, going wide of the upright. This move was followed by a determined onslaught, first by the Air Force forwards—who, early on, showed a mastery over their opponents in the loose—and shortly afterwards by the three-quarters, a promising movement on the part of the latter being brought to an untimely end by Pilot Officer White being crowded out into touch. Following this, Flying Officer Harvey attempted a drop at goal from about 30 yards, but the effort narrowly missed its aim. Faulty passing and handling spoiled a three-quarter-back run by the Navy, which threatened danger, as Stephenson, their international "three," unmarked, had a clear field. But the ball failed to reach him through the spoiling tactics adopted by the Air Force forwards, who up to this point had fairly dominated the game.

Twenty-five minutes after the start a free kick enabled the Navy to carry the game across the half-way line, and a long kick into touch by Garrett gained valuable ground. Two scrums followed within a few yards of the Air Force line, the pressure being relieved after the second of these through a good individual run by Flying Officer G. R. Beamish, who took the game again into the Navy's half. But the Navy "threes" got possession, and what promised to develop into a pretty passing movement along the whole line was cut short by a smart tackle on the part of Pilot Officer Pott, who brought Sub-Lieut. St. Clair Ford down heavily when that centre-three-quarter was running strongly. Pott was again prominent on the right a few moments later but when apparently with a clear run, he was overtaken and brought down by Lieut. Wood. The ball was then carried some way into Air Force territory by scrambling play, but Llewellyn, after misfielding, recovered and gained ground by a good kick into touch. Half-time arrived with no score.

Some sparkling play characterised the opening of the second

half, each set of backs attacking in turn without any appreciable gain resulting to either side. At this stage the Navy forwards were getting the ball out of the scrum more often than their rivals. Flight-Lieut. Odbert was prominent in some mid-field play, but fumbled a good pass from Sqdn.-Ldr, Russell when his three-quarters were well placed for a run just within the Navy's half. Play continued for a time on Navy soil, until Sub.-Lieut. Gosling cleared with a magnificent kick into touch. But the Air Force men were soon over the half-way line again, a good passing movement, wherein Sqdn.-Ldr. Russell figured prominently, being checked when a score was in the offing. Following this, the Navy right wing got away, and for a moment or two Stephenson looked as though he would get through on his own, but a good clearance by Llewellyn transferred the scene of the struggle. The real danger, however, came from the other wing, where Artificer Evans, running strongly, drew the defence before passing to Lieut. Wood, who grounded the ball near the corner flag 20 minutes after the restart. Lieut. Forrest narrowly failed with a difficult place kick. On the game being resumed, Lieut. Wood broke through again, but nothing came of his effort and the Air Force " threes " started a promising run. Lieut. Garrett, however, intercepting a pass, came through, with Sub.-Lieut. St. Clair Ford in close attendance. This pair, running clear of all opposition, with only the Air Force back to bar their way, easily eluded the defence, and Garrett, a couple of yards from the line, transferred to St. Clair Ford, for the latter to score between the posts, Lieut. Browne converting.

Despite their being eight points in arrears, the Air Force had had most of the play up to this point, and now came near to scoring a penalty goal through the aid of Llewellyn, whose attempt from near the touch-line fell just wide of the upright. Llewellyn met with more success five minutes later, when, with a well-judged kick which sent the ball between the posts, he credited his side with three points. But this turn of the tide came too late to wipe out the deficit, and a minute afterwards " no-side " brought a termination to the struggle, with the emergence of the Navy as victors by one converted goal and one try (8 points) to one penalty goal (3 points).

The Teams

Royal Navy. *Full back* : Sub-Lieut. C. G. Gosling (R.N.E. College, Keyham). *Three-quarters* : Right wing, *Lieut. H. W. V. Stephenson (H.M.S. *Vivid*) ; right centre, Sub-Lieut. D. St. Clair Ford (H.M.S. *Excellent*) ; left centre, Engine-Room Artificer H. G. Evans (H.M.S. *Pembroke*) ; left wing, Lieut. W. H. Wood (H.M.S. *Erebus*). *Half-backs* : stand-off, Lieut. C. R. Garrett (H.M.S. *Victory*) ; scrum, Joiner J. Husson (H.M.S. *Vivid*). *Forwards* : Lieut. T. G. P. Crick (Capt.) (H.M.S. *Victory*), Surgeon-Lieut. M. J. Brosnan (Royal Hospital, Haslar), Lieut. W. C. Thomas (H.M.S. *Alecto*), Lieut. J. W. Forrest (R.N. College, Greenwich), Lieut. H. T. Armstrong (R.N. College, Dartmouth), Leading Seaman C. P. Evans (H.M.S. *Pembroke*), Lieut. J. W. Cuthbert (H.M.S. *Excellent*), *Lieut. H. C. Browne (H.M.S. *Dolphin*).

Royal Air Force. *Full back* : Pilot Officer J. G. Llewellyn (No. 58 Sqdn., Worthy Down). *Three-quarters* : right wing, Pilot Officer N. H. White (No. 29 Sqdn., North Weald) ; right centre, Pilot Officer J. R. H. Pott (Central Flying School, Wittering) ; left centre, Pilot Officer R. D. Cotton (No. 5 Flying Training School, Sealand) ; left wing, Flying Officer S. D. Harvey (No. 7 Sqdn., Worthy Down). *Half-backs* : stand-off, *Flight-Lieut. R. V. M. Odbert (R.A.F. Headquarters, Andover) ; scrum, Sqdn.-Ldr. J. C. Russell (Air Ministry). *Forwards* : Sergt. A. C. Hall (Central Flying School, Wittering), Aircraftsman V. E. Maxwell (No. 19 Sqdn., Duxford), Flight-Lieut. F. V. Beamish (R.A.F. College, Cranwell), Flying Officer Tattersall (No. 56 Sqdn., North Weald), Flight-Lieut. C. D. Adams (R.A.F. Headquarters, Halton), Flying Officer J. Clarke (No. 29 Sqdn., North Weald), *Flying Officer G. R. Beamish (Capt.) (No. 3 Flying Training School, Grantham), Flight-Lieut. J. S. Chick (Central Flying School, Wittering).

* International.

THE ROYAL AIR FORCE

London Gazette, March 5, 1929.

General Duties Branch

The follg. Pilot Officers are promoted to rank of Flying Officer :—G. E. E. Singleton, R. W. M. Clark ; Jan. 18. A. W. Sandeman, L. P. Moore, C. C. O'Grady, de L. Cooke, W. M. Moore, R. J. O. Bartlett ; Jan. 30. J. C. K. Rogers ; March 2.

Sqdn.-Ldr. F. O. Soden, D.F.C., is placed on half-pay list, Scale B, from Jan. 1 to March 7, inclusive. (Substituted for *Gazette*, Jan. 18.) The follg. are placed on retired list at their own request :—Air Commodore E. A. D. Masterman, C.B., C.M.G., C.B.E., A.F.C. ; March 1. Group-Capt. K. G. Brooke, C.M.G. ; March 6.

Medical Branch

Flying Officer R. Thorpe is promoted to rank of Flight-Lieut. ; March 2.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. Pilot Officers are promoted to rank of Flying Officer :—H. J. Penrose ; March 1. E. H. Armitage, H. O'B. Howat, H. R. Turner ; March 5. Flying Officer T. Terrell, D.S.C., is transferred from Class B to Class C ; Dec. 23, 1928. The follg. relinquish their commns. on completion of service :—Flight-Lieut. D. F. Fitzgibbon ; Feb. 28. Flying Officer D. Gardiner ; Oct. 13, 1928. Flying Officer C. E. F. Arthur ; Feb. 24.

AUXILIARY AIR FORCE

General Duties Branch

No. 605 County of Warwick (Bombing Squadron.—The follg. Pilot Officers are promoted to rank of Flying Officer :—J. C. Rowland ; Jan. 24. J. A. Edwards ; Feb. 3.

Accountant Branch

No. 602 City of Glasgow (Bombing) Squadron.—The follg. Pilot Officer is promoted to rank of Flying Officer :—J. R. Stewart ; Feb. 12.

London Gazette, March 12, 1929.

General Duties Branch

Pilot-Officer C. W. Grannum is promoted to rank of Flying Officer Jan. 30) ; Flying Officer W. M. Phillips takes rank and precedence as if his appointment as Flying Officer bore date May 1, 1928, immediately following Flying Officer D. J. R. Hylton on the gradation list—reduction takes effect from Feb. 18 ; Flight-Lt. E. Brewerton, D.F.C., is placed on half-pay list, scale B. (Feb. 26 to March 4 inclusive) ; Flying Officer A. P. Marchant, M.B.E., D.S.M., is placed on retired list at his own request (March 13).

The following Flying Officers are transferred to the Reserve :—Class A.—P. E. G. Sayer (March 2) ; A. A. Rumsey (March 13). Class C.—E. G. D. Stewart, M.C. (March 5).

Flying Officer (Hon. Flight Lt.) A. E. G. Forrest resigns his short service commn. (March 7) ; Lt. R. H. Langton, R.N., Flying Officer, R.A.F., ceases to be attached to R.A.F. on return to naval duty (March 11) ; Flying Officer J. M. Fearon (Lt. The Green Howards) relinquishes his temp. commn. on return to Army duty (Jan. 13).

Stores Branch

Flying Officer A. McC. Goddard is placed on retired list at his own request and is granted permission to retain rank of Flight Lt. (Feb. 27).

Memorandum

The permission granted to Sec. Lt. F. Dorsey to retain his rank is withdrawn on his enlistment in the Supplementary Reserve (Feb. 16).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Pilot Officer T. R. Morrison is promoted to rank of Flying officer (March 6) ; Flying Officer F. H. Bugge is transferred from Class A to Class C (Dec. 5, 1928) ; Flying Officer F. R. Offord is transferred from Class C to Class A (Feb. 16). The following are transferred from Class B to Class C :—Flight Lt. S. Frost (Feb. 15) ; Flying Officer A. A. C. N. Smith (Jan. 20) (substituted for *Gazette* Feb. 26).

Flying Officer E. C. Hoar relinquishes his commn. on completion of service (March 2). The following relinquish their commns. on completion of service, and are permitted to retain their rank :—Flight Lt. C. H. Tancred, O.B.E. Dec. 3, 1928) ; Flying Officer W. W. Saunders (March 10).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron Leaders : D. Iron, O.B.E., to R.A.F. Base, Calshot ; 4.3.29. Hon. R. A. Cochrane, A.F.C., to No. 8 Sqdn., Aden : 1.2.29. C. St. Noble, to Home Aircraft Depot, Henlow ; 11.3.29. P. E. Maitland, A.F.C., to Sch. of Naval Co-operation, Lee-on-Solent ; 7.2.29. H. A. Smith, M.C., to R.A.F. Depot, Uxbridge ; 26.1.29.

Flight-Lieuts. : E. F. Turner, A.F.C., and J. A. Boret, M.C., A.F.C., to R.A.F. Base, Calshot ; 4.3.29. O. E. Carter, to Aircraft Depot, Iraq ; 26.2.29. I. Cullen, M.B.E., A.F.C., to H.Q., Fighting Area, Uxbridge ; 22.2.29. F. R. D. Swain, to No. 23 Sqdn., Kenley ; 1.3.29. W. A. B. Savile, to Central Flying Sch., Wittering ; 11.2.29. C. McM. Laing, M.C., A.F.C., to Station H.Q., Heliopolis ; 14.2.29. J. M. Burd, M.C., to Armoured Car Wing, Iraq ; instead of to No. 84 Sqdn., as previously notified ; 11.1.29. H. J. Gearing, to No. 4 Flying Training Schl., Egypt ; 13.2.29. R. M. Trevethan, M.C., to R.A.F. Depot, Uxbridge ; 26.1.29. G. E. Wilson, to Station H.Q., Duxford ; 26.2.29. P. F. Fullard, D.S.O., M.C., A.F.C., to H.Q., Iraq Command ; 1.3.29. D. H. Carey, to H.Q., Iraq Command ; 2.3.29.

Stores Branch

Squadron Leader : T. Bell, M.M., to R.A.F. Depot, Uxbridge ; 17.2.29.

Flying Officers : J. H. P. Clarke, to Air Ministry (D. of E.) ; 27.2.29. E. F. Smith, to No. 33 Sqdn., Netheravon ; 1.3.29.

Flying Officers : W. A. G. Goldsworthy, to R.A.F. Depot, Uxbridge ; 26.1.29. R. M. Taylor, M.C., to H.Q., No. 1 Air Defence Group ; 22.2.29. C. L. Thompson, to. No. 600 Sqdn., Hendon ; 28.2.29.

Accountant Branch

Flight-Lieuts. : M. H. Luker, to Station H.Q., Kenley ; 23.2.29. J. C. Brice, to Station H.Q., Worthy Down ; 26.1.29.

Flying Officers : D. A. K. Yiend, to No. 33 Sqdn., Netheravon ; 1.3.29. J. R. Ackers, to No. 35 Sqdn., Bircham Newton ; 1.3.29. J. A. T. Rose, to. No. 1 Sch. of Tech. Training (Apprentices), Halton ; 26.2.29.

Medical Branch

Squadron Leaders : J. Rothwell, M.B., to R.A.F. Depot, Uxbridge ; 19.1.29. F. J. Murphy, M.B., to H.Q., R.A.F., India ; 12.2.29. E. W. Craig, M.C., M.B., to Station H.Q., Heliopolis ; 10.2.29.

AIR MINISTRY NOTICES TO AIRMEN

Government-Owned Aerodromes : Prices of Petrol, &c.

1. The following prices will be charged from March 1, 1929, and until further notice, for aviation petrol and motor spirit issued for civil aviation at Government-owned aerodromes :—

Per gallon, exclusive of container :— Aviation mixture, 2*s.* 1½*d.*; aviation petrol, 1*s.* 11½*d.*; motor spirit, Grade I, 1*s.* 7½*d.* Grade III, 1*s.* 5½*d.*

Prices for aviation petrol and motor spirit in Scotland and Northern Ireland are 1*d.* more than the above prices.

(No. 13 of 1929.)

Precaution to be Taken when Using Very Lights

INSTANCES have occurred recently of public and private property being endangered from the burning debris of Very lights fired from a low altitude.

Experiments have shown that lights may still be burning when they reach the ground after being fired from a height of 1,500 ft. Lights should not therefore be fired from the air at lower altitudes than this, if it can possibly be avoided.

If it is necessary to fire lights at a lower altitude, pistols should be fired upwards within 45° of the vertical, and consideration should be paid to the ground on which the light will fall if it is still burning at the end of its flight.

(No. 14 of 1929.)

Maintenance of Aircraft and Engine Log Books

OWNERS of British aircraft that are used for private flying only (*i.e.*, not flown for carrying passengers or goods for hire or reward*) are strongly recommended in their own interests to maintain aircraft and engine log books so as to have available at all times a complete record of repairs and overhauls.

This record is particularly valuable when the aircraft has to be examined for renewal of its certificate of airworthiness. It will not only facilitate consideration of the owner's application for renewal but will obviate the difficulties and consequential delay which are likely to arise when particulars of repairs and overhauls have to be obtained from the firms who have carried out such work since the aircraft was last examined.

The aircraft log book (C.A. Form 27) and engine log book (C.A. Form 28) can be purchased from H.M. Stationery Office, either directly or through any bookseller, at a cost of 2*s.* 6*d.* each (exclusive of postage). Refills for either book can similarly be purchased at a cost of 1*s.* 3*d.* each (exclusive of postage).

* *Note.*—Aircraft and engine log books are required to be kept for all aircraft intended or used for carrying passengers or goods for hire or reward. —(See para. 1 (*b*) of Schedule III to the Air Navigation (*Consolidation*) Order, 1923.)

(No. 15 of 1929.)

AIR MINISTRY NOTICE TO GROUND ENGINEERS

Maintenance of Aircraft and Engine Log Books

GROUND engineers responsible for the inspection of British aircraft that are used for private flying only (*i.e.*, not flown for carrying passengers or goods for hire or reward*) are strongly recommended to take action to ensure that a complete record of the inspection by competent persons of all repairs and overhauls is maintained, preferably in aircraft and engine log books.

This record is particularly valuable when the aircraft has to be examined for renewal of its certificate of airworthiness. It will not only facilitate consideration of the owner's application for renewal, but will obviate the difficulties and consequential delay which are likely to arise when particulars of repairs and overhauls have to be obtained from the firms who have carried out such work since the aircraft was last examined.

The aircraft log book (C.A. Form 27) and engine log book (C.A. Form 28) can be purchased from H.M. Stationery Office, either directly or through any bookseller, at a cost of 2*s.* 6*d.* each (exclusive of postage). Refills for either book can similarly be purchased at a cost of 1*s.* 3*d.* each (exclusive of postage).

* *Note*—Aircraft and engine log books are required to be kept for all aircraft intended or used for carrying passengers or goods for hire or reward. (See para. 1 (*b*) of Schedule III to the Air Navigation (Consolidation) Order, 1923.)

(No. 7 of 1929.)

PERSONALS

Married

FLIGHT-LIEUT. WALTER AKERMAN, son of Mr. Martin Akerman, of Windsor was married on February 27, at Meerut, U.P., India, to DOROTHY WEBB, daughter of Major Webb, of Quetta.

To be Married

The marriage arranged between FLYING OFFICER RICHARD FOX OVERBURY (late R.A.F.), elder son of Mr. and Mrs. E. Fox Overbury, of "Greenlands," Ashford, Middlesex, and MARJORIE, elder daughter of Mr. and Mrs. B. Temple Wrinch, of "Cordwyes," Trimley, Suffolk, will take place on Easter Tuesday, April 2 next, at St. Mary's Church, Trimley, Suffolk at 1.30 p.m. Flying Officer Overbury is proceeding to Canada with his wife on April 4, to resume his duties as a pilot with the Ontario Provincial Air Services.

Death

JOHN COLQUHOUN DON (IAN), who died on March 2, at Willowmore, South Africa, as the result of a flying accident, was the youngest son of John Birrell Don, of Maulesden, Brechin. He was in his 25th year.

More "Moths!" for Australia

THE Defence Department for Australia has placed a contract for the construction of 32 D.H. "Moths," in Australia, at £448 each, states a *Times* correspondent. That price, which does not include that of the engine, is regarded officially as a most satisfactory one. The order has been placed partly to foster the local industry.

Haldon Aerodrome, S. Devon

IN the article on private aerodromes, last week, one should have mentioned the Haldon Aerodrome, near Teignmouth, South Devon, which was established by the Agra Engineering Co., of Teignmouth, nearly a year ago. "Avian" and "Cirrus" services are always available there, spares always being in stock. Private owners are welcomed on their way down to the West Country. It is understood the aerodrome is the only one of its kind west of Bristol or Yeovil. Particulars were published in FLIGHT last year.

COMPANY DOINGS

COMPER AIRCRAFT COMPANY, LTD—Capital £15,800 in 13,000 10 per cent. cumulative preference and 2,600 ordinary shares of £1 each, and 4,000 founders' share of 1*s.* each. Constructors and manufacturers of, dealers in and designers of aeroplanes, aeroplane engines, airships and flying machines of all kinds, etc. Solicitors: Wainwright, Pollock and Co., 9, Bush Lane, E.C. 4.

D. NAPIER AND SON, LTD.—The directors' report and accounts to September 30, 1928, signed by Mr. H. T. Vane, joint managing director, shows a profit on the year's trading, including interest on investments (after providing for depreciation, interest, taxation, directors' and trustees' fees, managers' commissions and contingencies), amounting to £167,438 9*s.* 10*d.* Add balance brought forward, £45,622 6*s.* 5*d.* Total, £213,060 16*s.* 3*d.* Deduct dividend paid on cumulative preference shares at 7½ per cent. per annum (less income tax) for the twelve months ended June 30, 1928, £22,500, and dividend paid on non-cumulative preference shares at 8 per cent. per annum (less income tax) for the twelve months ended September 30, 1928, £14,560, leaving £176,000 16*s.* 3*d.* An interim dividend of 5 per cent. (less income tax) was paid on the ordinary shares on October 15, 1928—£27,300. The directors now recommend that a final dividend of 10 per cent. (less income tax) be paid on the ordinary shares, making in all 15 per cent. (less income tax) for the year, £54,600, and to transfer to general reserve, £50,000, leaving a balance to carry forward of £44,100 16*s.* 3*d.*

There has been transferred to general reserve the sum of £50,000, from provision made in past years in respect of guarantees on motor vehicles, which is no longer required in consequence of claims received being less than anticipated when the sums were so set aside.

The directors are of opinion that the time has now arrived for the distribution of a portion of the money invested outside the business. With the circular are sent a print of the scheme and notices convening the necessary meetings of the company, and of the various classes of shareholders which have been directred to be held by the Court.

PUBLICATIONS RECEIVED

The Practical Electrician's Pocket Book, 1929. Odhams Press, Ltd., 93, Long Acre, W.C.2. Price 2*s.* 6*d.* net.

Éléments Créateurs du Droit Aérien. By André Henry-Coüannier. Per Orbem, 4, rue Tronchet, Paris.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910.)

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1927 being given in FLIGHT, January 19, 1928.

	Imports.		Export.		Re-exports.	
	1928.	1929.	1928.	1929.	1928.	1929.
	£	£	£	£	£	£
Jan.	.. 1,220	2,852	157,598	74,307	330	100
Feb.	.. 1,772	6,532	118,622	195,369	345	2
	2,992	9,384	276,220	269,676	675	102

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1927

Published March 21, 1929

31,333. O. KRELL. Rotatable hangars for airships. (306,498.)

31,533. A. H. R. FEDDEN AND BRISTOL AEROPLANE CO., LTD. Controlling means for i.c. engines. (306,587.)

APPLIED FOR IN 1928

Published March 21, 1929

1,375. G. H. DOWTY. Construction of disc wheels. (306,669.)

2,813. S. E. SAUNDERS. Motor, flying and other boats, seaplane floats, etc. (306,676.)

21,601. PHOTOGRAMMETRIE GES. Apparatus for plotting from aerial photographs. (294,652.)

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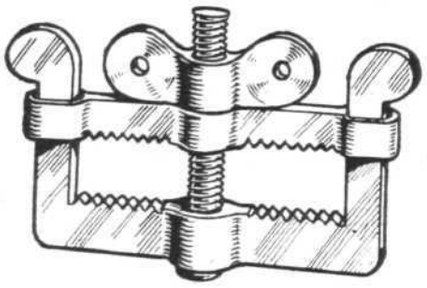

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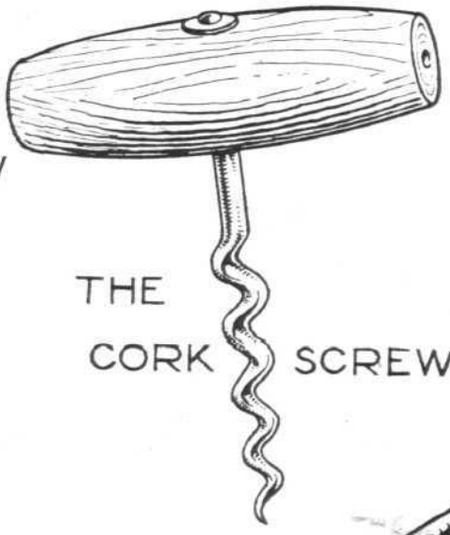

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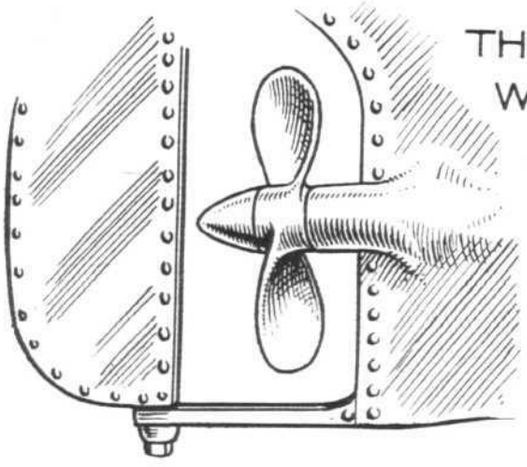

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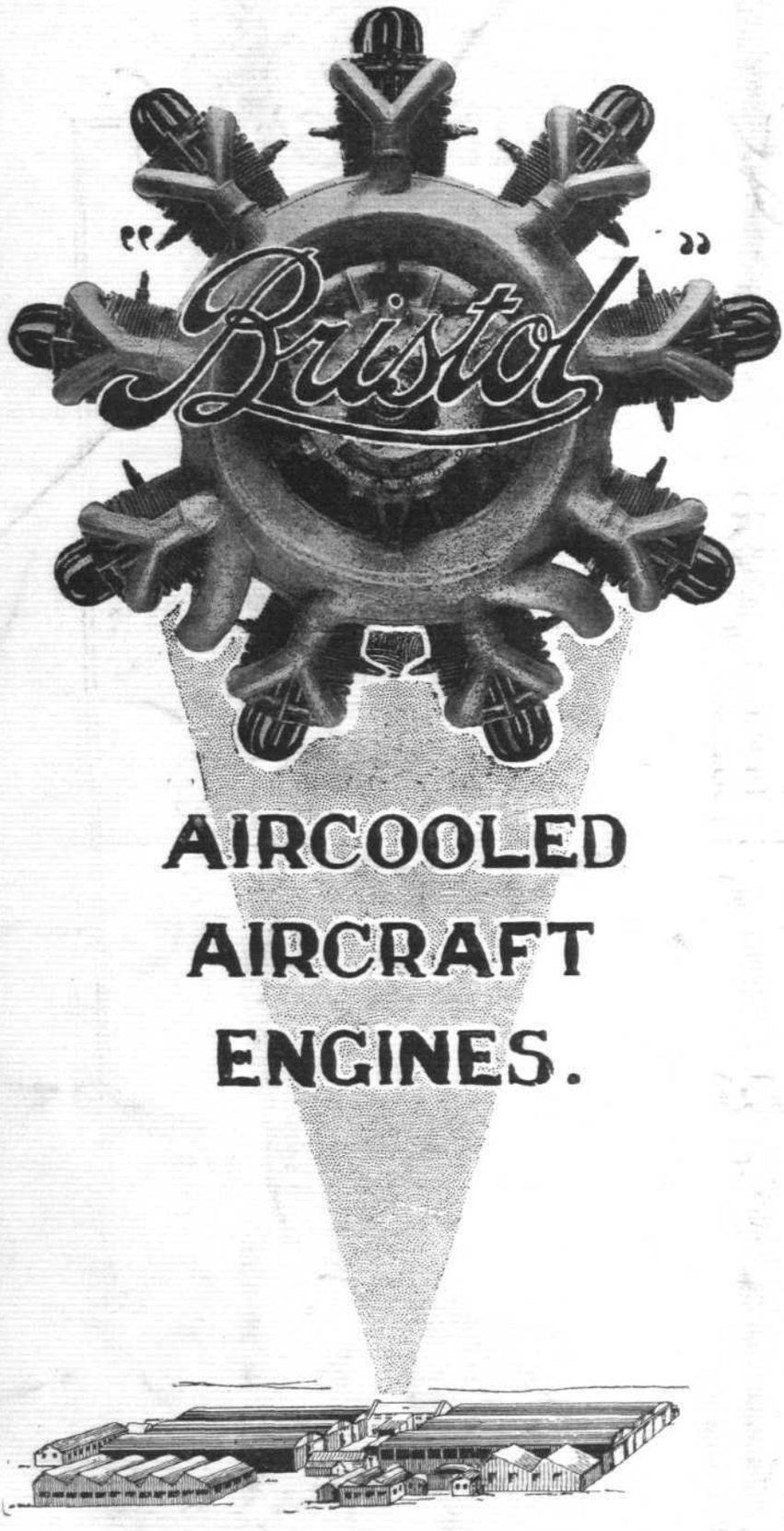

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